

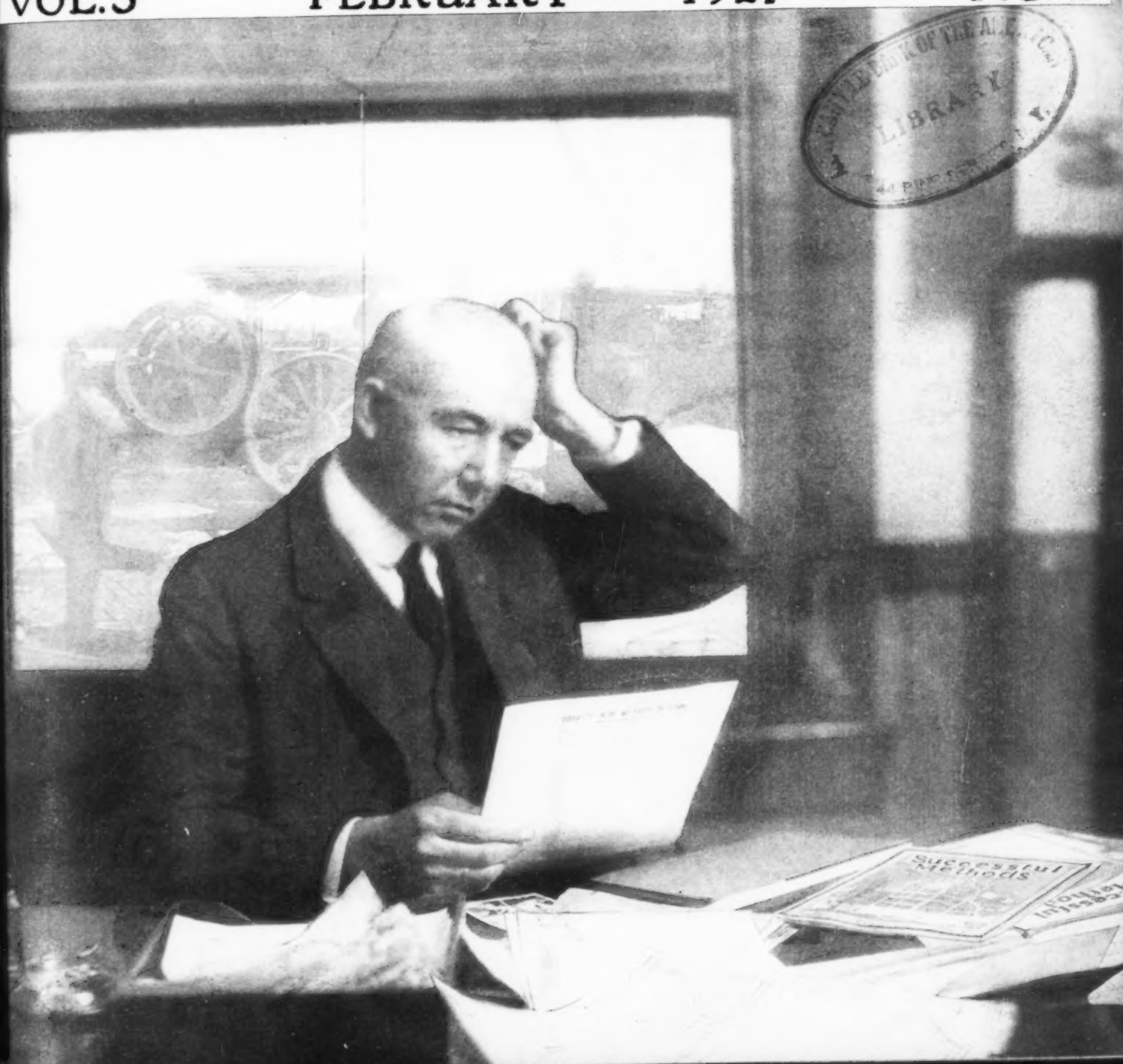
Successful Methods

Construction • Road Making • Engineering • Industrial • Mining

VOL. 3

FEBRUARY — 1921

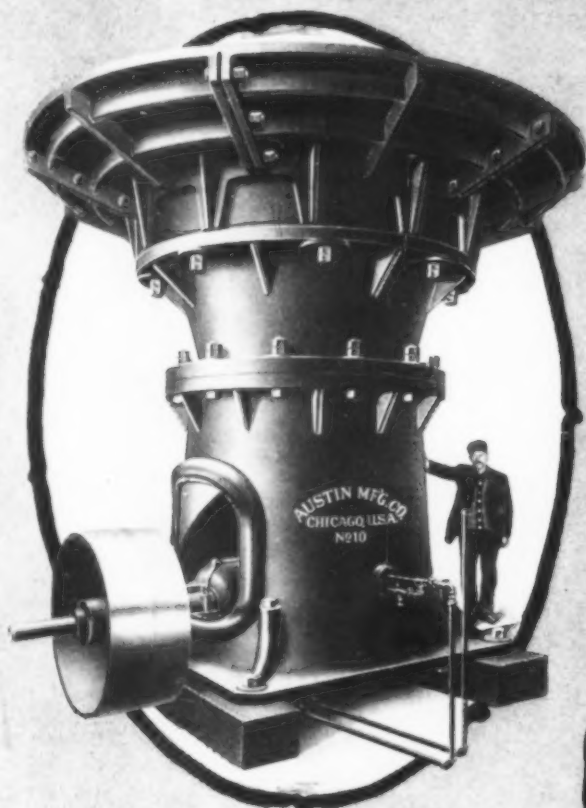
NO. 2



When It Comes To Crushing Rock



OUR SMALLEST



OUR LARGEST

An Austin For Every Job

No matter what your requirements, you'll find one of the Austin Gyratory Crushers to exactly suit you.

See the two we picture here. Note the contrast in size. The big fellow dwarfs a husky man.

Eight Sizes 5 to 500 Tons Hourly Capacity

When you couple the superior operating advantages of the Austin Crushers, with the great economies effected by having a machine to turn out just as much rock as you need each hour with assurance of absolute reliability and durability—no waste power or labor—you'll understand why stone producers find Austins so satisfactory.

Catalog No. 28 describes the complete line of Austin Gyratory Crushers as well as other Austin rock equipment. Write for your copy at once.

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Austin Gyratory Crushers

Successful Methods

A Magazine of Construction Service

Published by
MANUFACTURERS PUBLICITY BUREAU
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140 South Dearborn Street, Chicago.

Vol. III

February, 1921

No. 2

CHEER UP!

This is the time of the year when our Uncle Sam begins to take keen interest in the welfare of each and every one of us. He wants to know so many little things about our goings on and especially about our money matters, that if it were not for the family relationship we would be inclined to tell him to mind his own business.

Some of us now and then yield to the temptation to tell him just that, but he seems proof against such rudeness and as his persistence is armed with dire penalties for refusing to answer his questions, even the most rebellious of us give in—and give up.

And after all, this income tax cloud has its silver lining—for us as well as for Uncle Sam. First, it puts us all in the same boat; we all find ourselves wrestling with our returns at the same time and no trouble is unbearable if you know that the other fellow is being hit with the same stick.

Then we do get some of our money back in the form of roads, public buildings, the military and naval forces that insure us against foreign aggression and a host of other tangible things. Often it seems as though too many dollars of the taxes we pay go to provide salaries for government officials but even that has its compensation. Someone has to do our work for us, and just think how dreadful it would be if we should economize by abolishing government offices and thus deprive every small boy in the land of his inalienable right to picture himself as a future President—salary and all.

So smile a bit this year, when you pay your income tax. Everybody else is doing it, and most of us are more than likely to survive the shock. We hear much of people and businesses who are “taxed to death” but that is like dying of a broken heart—the authentic cases are few and far between. So cheer up!

This Magazine Will Be Sent to Men Who Can Use It

EDITORIALS

The Missing Link

THE article on page 9 of this issue of **SUCCESSFUL METHODS** tells the story of what one construction expert describes as the missing link between tower and chutes for placing concrete and hand labor with buggies or barrows.

The article is an interesting one and opens the way for considerable discussion. The use of belt conveyors for placing concrete has been regarded by many as impractical, but the photograph on page 9 accompanied by the article written by the Construction Supervisor of the company that did the job described, indicates that it can be so used successfully.

It is only by trying out schemes that progress is made. Here is an experiment which many said would not work, but which has worked, and has achieved real progress by filling a long felt want.

A Good Word for the Contractor

SO much space in **SUCCESSFUL METHODS** has been devoted to the subject of co-operation between engineers and contractors that the following excerpt from the latest issue of the Bulletin issued by the Illinois Highway Department fully deserves the space it occupies here. In Illinois at least, the contractor's share of the burden is appreciated. The Bulletin says:

"The record of the year should not be closed without giving credit to the contractors who fought determinedly to complete their contracts even in the face of this dis-

couraging situation. The public should know that the increased cost of labor and materials, as well as the intermittent supply of materials, causing the contractors to close down work for a day or a week at a time, while being obliged to keep their men on the pay roll in order that their organization should not be dissipated, has in many cases meant the absorption of all their profits and in some instances even a direct loss. The contractors should also be commended for their effort to conform strictly to the specifications of the Department in producing a road of good quality despite the unfavorable conditions with which they had to contend."

The Biggest Road Job

NOT content with its original program of 283 miles of paved road, the Maricopa County Highway Commission has added 22 miles, bringing the total up to 315. An additional bond issue passed by a splendid majority brings the total sum to be spent for this great improvement up to \$8,500,000.

Maricopa County, Arizona, surely is making history in American highway building. An article describing certain places of the work appears in this issue of **SUCCESSFUL METHODS**.

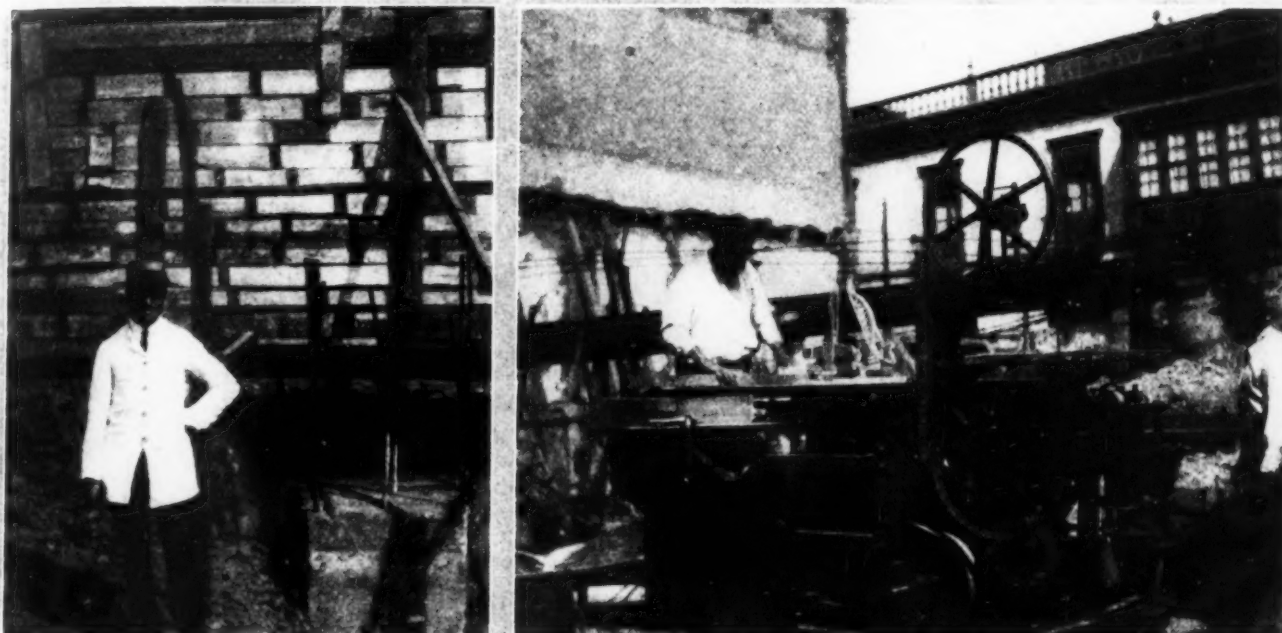
Successful Methods to Move

AFTER February 1st, 1921, the editorial and publication offices of **SUCCESSFUL METHODS** will be at 141 Centre St., New York City. All communications should be sent to that address.

A Gas Paver at Work in Maricopa County, Arizona



BUILDING CONSTRUCTION IN PERU'S CAPITAL

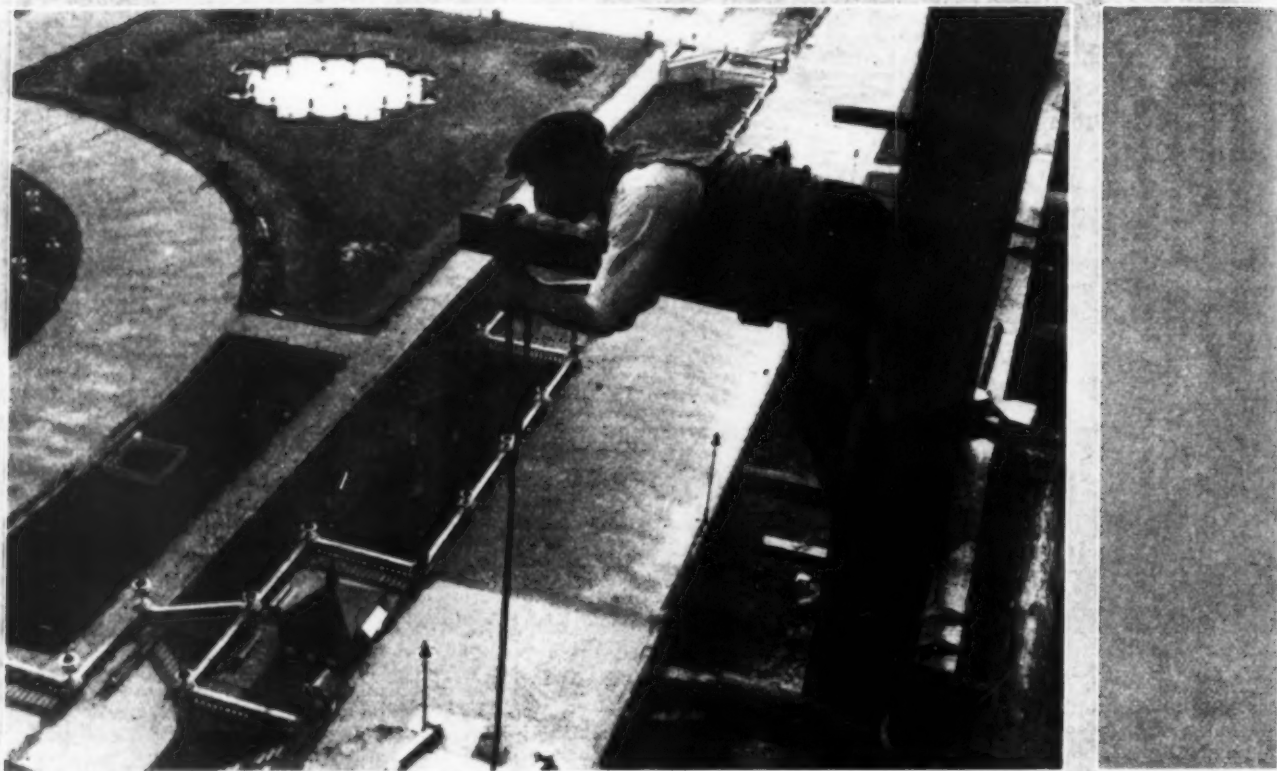


Above—The photograph at the left shows part of the reinforced concrete foundations of the new National City Bank Building in Lima. This building is owned by the Compania de Seguros "Italia." The man in the photograph is Senor Alfredo Viale, designer and engineer in charge of construction. The photograph at the right shows a saw rig made in the United States cutting forms for the reinforced concrete columns.

Below—A concrete mixer made in the United States at work on the new building of the Compania de Recaudadora de Impuestos on Avenida de Colmena in Lima. Senor Alejandro Garland is responsible for the design and construction of this building.

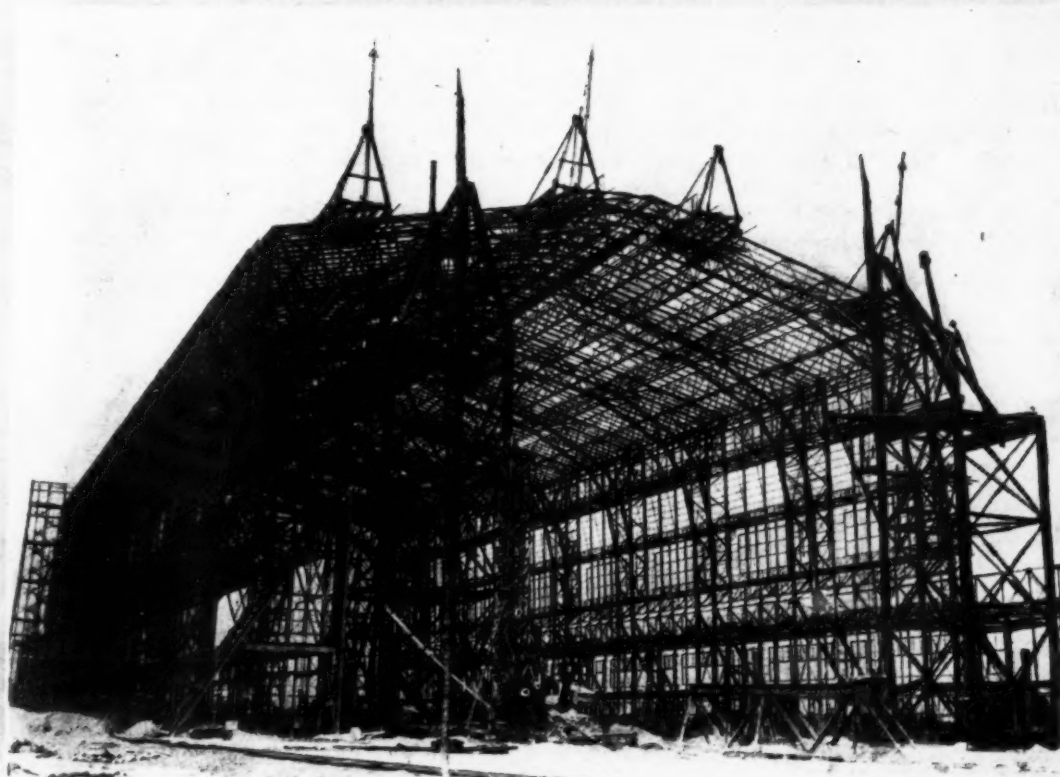
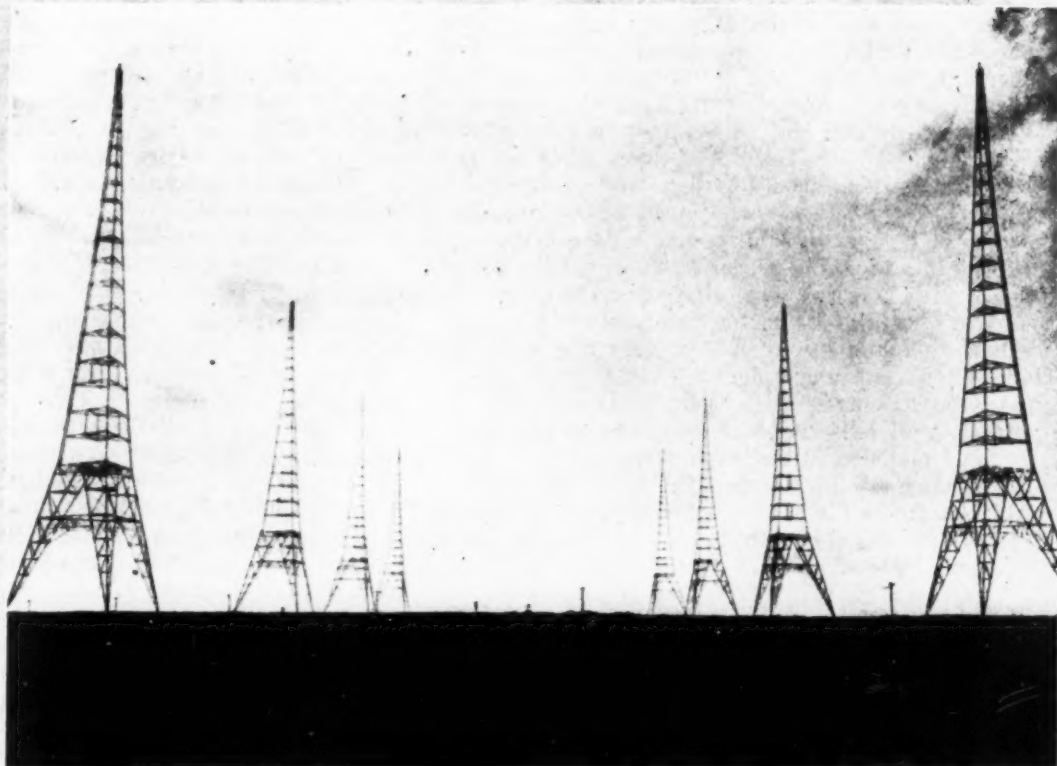


STEEL WORKERS AND STEEL WORK



The British workman repairing the roof of the Crystal Palace in London, prefers a horizontal position. His American brothers at work on a Chicago skyscraper seem a little less conservative. They move around nonchalantly about as they would if they were down on the ground. (Copyright, Underwood & Underwood)

AT HOME AND ACROSS THE SEAS



The structures on this page are helpers in the task of making the world smaller. The wireless towers in the upper photograph built near Bordeaux by the French and the U. S. Navy, have just been finished. Below is the U. S. Navy's new dirigible hangar at Lakehurst, N. J. (Copyright, Underwood & Underwood.)

MAKING OUT THE INCOME TAX RETURN

A Few Helpful Hints Illustrated by Reproduction of Parts of the New Form

[By James J. Redding, of Cox, Komarek & Redding, Public Accountants]

MAKING out an income tax return is such a vexatious task that a little help is usually welcomed. For that reason I have taken one of the 1921 blanks, filled it out with the year's record of a purely fictitious construction company and also have set down some of the points which need special attention in making out the return. Things which should be done and things which should be avoided—both are mentioned in the hope that the readers of *SUCCESSFUL METHODS* will be helped.

The first thing to do in preparing to fill out the return is to make sure that you have all the necessary records of your year's work and that they are posted up to date. Before making a single mark on your return be sure that the following accounting is done:

- Post all entries to the job cost ledger.
- Post all bills for material delivered to the job and included in the estimates.
- Accrue all interest receivable and payable.
- Determine the amount of unexpired insurance.
- When equipment is charged to the jobs on a rental basis, see that rental charges of equipment are charged against the different jobs.
- Charge all jobs with the total amounts due on sub-contracts, particularly the amount retained on the estimates for payment.
- Accrue all premiums on liability insurance.
- Charge off the full amount of depreciation of equipment, buildings, furniture and fixtures, which will average from 15 to 25 per cent for equipment, from 2 to 5 per cent for buildings, and from 10 to 20 per cent for furniture and fixtures.

In making these entries preliminary to filling out the returns, there are several common mistakes that should be watched for and avoided. From our experience we have learned that a number of concerns fail to make proper allowance for bills for material which has actually been used in the work because they do not have a receiving

report, and consequently must guess that all bills have been received. Don't guess. Keep accurate records of material received on each job.

We also have found that a large number of concerns overlook taking up the cash surrender value of insurance policies as an asset and accruing the interest due on notes receivable and payable. These should not be omitted as they are necessary to an accurate statement of income profit and loss and balance sheet.

A number of contractors simply show the 85, 75 or 50 per cent paid or due on sub-contracts as a cost of the job and forget to include the amount withheld as an expense of the job. This is a very common mistake and one which will easily happen unless considerable care is exercised.

After making all the entries in the books draw off a trial balance. The next procedure is to make a statement of Income Profit and Loss, Balance Sheet and Analysis of the Surplus Account. Make these statements on analysis paper for permanent record as they will be required when the Government auditor steps in to check your accounts. This balance sheet can be used in preparing Schedule K, a balance sheet which must accompany the income tax return. On last year's return the government required the Schedule L—Analysis of Surplus Account—also to be attached to the return, but this year the analysis of the Surplus Account is incorporated in Schedule L—Reconciliation of Net Income and Analysis of Charges in Surplus—which is made a part of the return itself as shown at the bottom of this page.

In the specimen blank on page 7, the Gross Income from Operations, \$169,456.98, Line 3 of the Corporation Return, was arrived at by deducting \$3,699,543.02, the actual cost of completed jobs and the estimated cost of uncompleted jobs, from \$3,869,000.00, the contract price of completed jobs and the estimated value of completed work on uncompleted contracts. Getting these figures right is most important because the accuracy of the whole

Page 4 of Return.			
SCHEDULE L.—RECONCILIATION OF NET INCOME AND ANALYSIS OF CHANGES IN SURPLUS.			
1. Net income from Schedule A, Item 27	\$	92	263 47
2. Nontaxable income:			
(a) Interest on obligations of the United States and its possessions wholly exempt			380 91
(b) Interest on obligations of States, Territories, and political subdivisions thereof			
(c) Interest on Farm Loan Bonds issued under Federal Farm Loan Act			
(d) Dividends on stock of domestic corporations and from foreign corporations taxable by the United States on their net incomes			
(e) Dividends on stock of personal service corporations out of earnings upon which a Federal income tax has been imposed			
(f) Profits which are derived from the sale of vessels and which are exempt under section 23 of the Merchant Marine Act of 1920			
(g) Other items of nontaxable income (to be detailed):			
(1)			
(2)			
(3)			
3. Charges against reserves for bad debts, contingencies, etc. (to be detailed):			
(a)			
(b)			
(c)			
4. Total of Items 1 to 3, inclusive	\$	92	644 38
5. Total from Item 12	\$	3	508 79
6. Net profit for year as shown by books, before any adjustments are made therein (Item 4 minus Item 5)	\$	89	135 59
7. Surplus and undivided profits as shown by balance sheet at close of preceding taxable period	\$	124	823 61
8. Other credits to surplus (to be detailed):			
(a)			
(b)			
(c)			
9. Total of Items 6 to 8, inclusive	\$	213	959 20
10. Total from Item 7	\$	11	000 00
11. Surplus and undivided profits as shown by balance sheet at close of taxable period (Item 9 minus Item 10)	\$	202	959 20
12. Unallowable deductions:			
(a) Donations, gratuities, and contributions	\$		516 66
(b) Income and profits taxes paid to the United States, its possessions, or foreign countries	\$	2	160 00
(c) Special improvement taxes tending to increase the value of the property assessed			
(d) State, county, and municipal taxes paid by banks and other corporations based on the value of their capital stock			
(e) Furniture and fixtures, additions, or betterments treated as expenses on the books		92	50
(f) Replacement and renewals			
(g) Insurance premiums paid on the life of an officer or employee for the benefit of the corporation or business		739	63
(h) Interest on indebtedness incurred or continued to purchase or carry securities (other than obligations of the United States issued after September 21, 1917), the interest upon which is wholly exempt from taxation			
(i) Addition to sinking fund reserve, and reserves for bad debts and other contingencies (to be detailed):			
(1)			
(2)			
(3)			
(j) Other unallowable deductions (to be detailed)			
(1)			
(2)			
(3)			
13. Total of Item 12	\$	3	508 79
14. Dividends paid during the taxable period (state whether paid in cash, stock of this company, or other property):			
(a) Date paid February Character Cash	\$	5	000 00
(b) Date paid May Character Cash	\$	2	000 00
(c) Date paid September Character Cash	\$	2	000 00
(d) Date paid December Character Cash	\$	2	000 00
15. Other debits to surplus (to be detailed):			
(a)			
(b)			
(c)			
16. Total of Items 14 and 15	\$	11	000 00

This part of the return is new this year. It simplifies your work.

IF RETURN IS FOR
CALENDAR YEAR 1920
FILE IT WITH THE
COLLECTOR OF INTERNAL
REVENUE FOR YOUR
DISTRICT ON OR BEFORE
MARCH 15, 1921

IF FOR A PERIOD OTHER
THAN A CALENDAR
YEAR THE RETURN
SHOULD BE FILED ON OR
BEFORE THE 15TH DAY
OF THE THIRD MONTH
FOLLOWING THE CLOSE
OF SUCH PERIOD

Page 1 of Return
Form 1120—UNITED STATES INTERNAL REVENUE SERVICE
CORPORATION INCOME AND PROFITS TAX RETURN
FOR CALENDAR YEAR 1920
Or for period begun January 1, 1920, and ended December 31, 1920.

(PRINT PLAINLY CORPORATION'S NAME AND BUSINESS ADDRESS)

CHICAGO CONSTRUCTION COMPANY
CHICAGO, Illinois.

(DO NOT WRITE IN THIS SPACE)

Examined by

Audited by

FIRST PAYMENT

Cashier's Stamp

CASH
CHECK
M. O.
CERT.
of IND.

KIND OF BUSINESS

Contracting

IS THIS A CONSOLIDATED RETURN? No

SCHEDULE A—TAXABLE NET INCOME.

GROSS INCOME.			
1. Gross sales, less returns and allowances			
2. Less cost of goods sold, exclusive of expenses, repairs, and other items called for separately below (from Schedule A2)			
3. Gross income from operations other than trading or manufacturing, less allowances (from Schedule A3)	169	456	98
4. Taxable interest on obligations of the United States and War Finance Corporation Bonds (from Form 1123, see Schedule A4)			
5. Taxable interest from all other sources (from Schedule A5)		400	00
6. Rentals	2	000	00
7. Royalties	1	200	00
8. Share of net income earned by personal service corporation during its accounting period (whether received or not)			
9. Dividends on stock of (a) foreign corporations (from Schedule A9), and (b) domestic corporations, except personal service corporations from earnings accumulated on and after January 1, 1918, \$			
10. Gross income from all other sources (not including any amount reported in Item 22, below) (from Schedule A10)		970	97
11. TOTAL OF ITEMS 1 TO 10			174 027 95
DEDUCTIONS.			
12. Ordinary and necessary expense (except amounts reported in Item 2 above or called for separately below) (from Schedule A12)	22	776	79
13. Compensation of officers (including salaries, commissions, and other compensation in whatever form paid) (from Schedule A13)	47	510	12
14. Repairs (including labor, supplies, etc.) (from Schedule A14)	2	345	00
15. Interest (see page 2 of Instructions, paragraph 9)		340	00
16. Taxes (from Schedule A16)		230	00
17. Debts ascertained to be worthless and charged off within the taxable period (from Schedule A17)	1	200	00
18. Exhaustion, wear and tear (including obsolescence) (from Schedule A18)	3	917	07
19. Depletion (from Schedule A19)			
20. TOTAL OF ITEMS 12 TO 19			78 518 98
21. DIFFERENCE BETWEEN ITEMS 11 AND 20			95 508 97
22. Profit or loss on sales of capital assets and miscellaneous investments, including liquidating dividends (from Schedule A22)	3	245	50
23. Losses sustained during the taxable period and not compensated for by insurance or otherwise. (From Schedule A23.) (Extend to last column sum of or difference between Items 22 and 23)			3 245 50
24. Net income for taxable period exclusive of deductions for dividends and amortization (sum of or difference between Items 21 and 23, the latter as extended)			92 263 47
25. Dividends on stock of (a) foreign corporations taxable by the United States on their net incomes, and (b) domestic corporations, except personal service corporations from earnings accumulated on and after January 1, 1918			
26. Amortization of war facilities (from Schedule A26) (extend total of Items 25 and 26)			
27. NET INCOME FOR TAXABLE PERIOD (difference between Items 24 and 26, the latter as extended—to be entered as Item 5, Schedule D)			92 263 47
28. Less deduction provided in the first paragraph of Section 23, Merchant Marine Act of 1920 (see page 1 of Instructions, paragraph 4)			
29. Net income of a corporation owning ships engaged in foreign trade (amount to be used only in computing profits tax in Schedule D)			

SCHEDULE B—INVESTED CAPITAL.

ITEM.	AMOUNT.
1. Capital, surplus, and undivided profits at beginning of taxable period as shown by books (from Schedule E, Item 1)	489 823 61
2. Plus adjustments by way of additions (from Schedule F, Item 4)	
3. TOTAL	489 823 61
4. Less adjustments by way of deductions (from Schedule G, Item 7)	
5. REMAINDER	489 823 61
6. Plus or minus changes in invested capital during taxable period (Net Increase or Decrease from Schedule H)	5 295 55
7. TOTAL (OR REMAINDER)	484 528 06
8. Less deduction on account of inadmissible assets (from Schedule J)	
9. Invested capital for taxable period. (If return is for a period less than a full year, see page 2 of Instructions, paragraph 11)	484 528 06

SCHEDULE C—EXCESS PROFITS CREDIT.

1. Eight per cent of invested capital for taxable period (Item 9 of Schedule B)	38 762 24
2. Exemption (\$3,000) (except for foreign corporations)	3 000 00
3. Excess Profits Credit (Item 1 plus Item 2). (If return is for a period less than a full year, see page 2 of Instructions, paragraph 11)	41 762 24

SCHEDULE D—COMPUTATION OF TAXES.

1. BRACKETS.	2. AMOUNT OF NET INCOME (ITEMS 27 OR 29, SCHEDULE A) IN EACH BRACKET.	3. EXCESS PROFITS CREDIT (ITEM 3, SCHEDULE C).	4. BALANCE SUBJECT TO TAX.	5. RATE.	6. AMOUNT OF TAX.
1. Net income, not in excess of 20% of invested capital	92 263 47	41 762 24	50 501 23	20%	10 100 25
2. Balance of net income				40%	
3. Totals computed under Section 301(b)	92 263 47	41 762 24	50 501 23		10 100 25
4. Excess Profits Tax, if computed under Sections 302, 303, 304(c) or 317 of the Revenue Act of 1918 (see page 2 of Instructions, paragraph 11)					32 305 39
5. Net income for taxable period (Item 27, Schedule A)	92 263 47				8 016 32
6. Less: Taxable interest on obligations of United States and War Finance Corporation Bonds (Item 4, Schedule A)					
7. Excess profits tax (Item 3 or 4, column 6, Schedule D) or	10 100 25				
8. Excess profits and war profits taxes (Item 16, Form 1120S, income from Government contracts)					
9. Exemptions, except for foreign corporations, \$2,000 units; return is for less than a year (see page 2 of Instructions, paragraph 11)	2 000 00	12 100 25			
10. Balance subject to income tax (Item 5, less Items 6, 7, and 9, or Item 5, less Items 6, 8, and 9)	80 163 22				
11. Tax of 19% on Item 10					
12. Total tax (Item 3, 4, or 8 plus Item 11)					
13. Less: Income and profits taxes paid to foreign countries or possessions of the United States. (See sections 238 and 240(c) of Revenue Act of 1918)					
14. Income tax withheld at the source in case of a foreign corporation not engaged in a trade or business within the United States, and not having any office or place of business therein					
15. Balance of tax (Item 12 minus Items 13 and 14)					18 116 57

AMENDED RETURNS.

An amended return must be plainly marked "Amended" across the face of the return.

CHECKS AND DRAFTS.

Checks and drafts will be accepted only if payable at your Collector's office.

• RED

How your Income Tax Return should look when properly filled out.

Item	Amount
Capital stock paid up and actually outstanding at the close of the preceding year	
1. First preferred.....	200,000.00
2. Second preferred.....	150,000.00
3. Common.....	
4. TOTAL.....	350,000.00
Surplus and undivided profits:	
5. Paid-in surplus.....	
6. Earned surplus and undivided profits.....	124,823.61
7. Reserves, additions to which are not deductible in computing net income (to be reconciled with balance-sheet items).....	15,000.00
8. Other items (to be detailed).....	
9. TOTAL OF ITEMS 4, 5, 6, 7, AND 8.....	489,823.61
10. Deduction on account of treasury stock.....	
11. Capital and surplus at beginning of taxable period as shown by books.....	489,823.61

We are inserting the item of \$32,305.39, Line 4, Schedule D on page 1 of the return in order to show the amount of tax due according to Section 302—Limitation of Taxes. In this case it is much better to use the Com-

These are only some of the high spots that will be encountered in preparing your income tax return. It is impossible to set forth in the small space allotted to this article a complete guide for income tax payers. It is equally impossible to anticipate all of the various contingencies which may arise in the course of a contractor's work. The United States Treasury Department issues and distributes a book entitled, "Regulations 45 Relating to the Income Tax and War Profits and Excess Profits Tax," which will help to solve the problems that come up. With the aid of this guide and by following the directions printed on the form, it ought not to be an extremely difficult task to prepare a proper return.

3. Changes in invested capital during the taxable period ordinarily arise in one or more of the following ways:

- (a) Addition—
 - (i) Sale of capital stock for cash or by the issue of capital stock for tangible or other assets.
 - (ii) The payment of assessments by stockholders or by creation of paid-in surplus by contribution of stockholders.
- (b) Deduction—
 - (i) By liquidation of part of the capital by retirement of stock or by purchase of treasury stock not out of current earnings.
 - (ii) By payment of cash dividends out of earnings of prior years.
 - (iii) By payment of Federal income and profits taxes for previous years.

The changes with respect to taxes will occur in nearly every case. Should no changes be noted, the reason for the omission should be stated.

2. The following instructions should be followed in making the above adjustments; each item should be designated as an addition or deduction, deduction being designated by red ink:

- (a) If stock is issued for cash, the actual cash received (but not the amount of discount) should be entered in this Schedule. Assets (other than cash) paid in for stock must be valued in accordance with Section 2039(a)(2) of the Internal Revenue Act of 1954.
- (b) If capital stock of the corporation is required but not paid for out of current profits, the cost of such stock should be deducted from invested capital.
- (c) Report dividends paid out of profits of prior years but not dividends paid out of profits of the taxable period. Any distribution made during the first 60 days of the taxable period shall be deemed to have been made from earnings or profits accumulated during the preceding taxable period, but any distribution made during the remainder of the taxable period shall be deemed to have been made from the profits for that period to the extent that such profits are sufficient. (See Sections 507 and 1349, Regulations 45.)
- (d) The amount of Federal income and profits taxes payable should be prorated and deducted as if the taxes when due and payable whether reserves have been set up on the books or not. (See Article 86.)

The average adjusted deduction to be entered in column 7 equals total income and profits tax multiplied by 0.1214.

3. The data called for in columns 1 to 3 should be given for all transactions, except that columns 2 and 4 are applicable only to the issue or reacquisition of the corporation's stock.

4. In column 6 enter the number of days remaining in the taxable period (including the date of change).

5. The net changes not reported in Schedule L, if not in accordance with the increases or decreases reflected in the balance sheet, should be fully reconciled therewith.

All changes in the amount of Invested Capital must be set down in Schedule H on Page 2 of the Return. The figures in column 7 should be written in red.

Successful Methods Income Tax Service

A great variety of questions in regard to the Successful Methods Income Tax Service. Remember that this service, like Successful Methods itself, is free to men who can use it.

CONVEYORS USED IN PLACING CONCRETE

Provide Missing Link Between Towers and Hand Labor

BY JOHN STEARNS



A BELT CONVEYOR CARRYING CONCRETE FROM THE MIXER TO THE FORMS

THE construction of the mast foundations at the Tuckerton station of the Radio Corporation of America presented a difficult situation which was overcome by the use of light, mobile, equipment. The station is situated on the Jersey Meadows about six miles from Tuckerton and was originally built for the German Government. Since coming into possession of the Radio Corporation of America after the war a decision was reached to increase its capacity, and a contract was accordingly awarded to the J. G. White Engineering Corporation of New York City to erect six steel masts, each 305 ft. high.

The foundations for these masts were excavated in swampy material, which necessitated sinking coffer dams to a depth of 8 to 10 feet for each of the six masts and twenty-four anchorages. On account of the poor bearing quality of the soil it was found necessary to drive piling in each coffer dam.

As the ground was not able to sustain heavy equipment, it was deemed expedient to design a special rig for driving these piles. This was accomplished by equipping a light pile driver with a gasoline hoist and supplementing it with gasoline-operated jetting equipment of sufficient power to insure penetration to the desired depth.

This same situation presented a problem in concreting the foundations and in distributing sand, gravel, cement and lumber, as well as steel for the masts. A unit consisting of one mast and four anchorages required

approximately 250 yards of concrete, making an average of 50 cubic yards for each individual pour.

After a careful study of the situation there was employed for material distribution two small tractors especially equipped with an extension to the traction wheel to afford as wide a bearing as possible. Each tractor was coupled to an ordinary light gravel wagon of the stick-box type equipped with extra wide tires. These were able to travel on the meadows in any direction and operated in a most economical manner.

The design of the foundations made it necessary for them to extend above the ground from 8 to 10 ft. To pour this concrete it was decided to use one-batch mixers operating in conjunction with 30-ft. portable belt conveyors. This equipment, illustrated in the attached photograph, is light and can be easily and quickly moved. The conveyors proved entirely satisfactory for raising the concrete to the necessary elevation that would permit of a distribution by chutes into the forms. The concrete was admitted to the conveyor through a wooden hopper having an opening directly over the belt which allowed a discharge without scattering the material and a delivery without waste. It was found necessary to place a wiper made of belting or rope on the top of the chute under the conveyor in order to keep the belt clean.

This lay-out is operating efficiently and is particularly well adapted for the work at hand.

New England Roadbuilders Organize

THE efficiency of roadbuilding in New England will be advanced by the New England Road Builders' Association formed in Boston last month. The by-laws of the new association state that its object is to promote better relations between contractors and officials, to re-

lieve the contractor of risk in bidding, and to encourage sound business methods but not to control prices nor restrict competition. The officers are: Ransome Rowe, president; John F. Coleman, vice-president; Joseph A. Tomaselle, treasurer, and Samuel Hobbs, secretary.

REBUILDING A CHICAGO VIADUCT

Concrete Replaces Steel on Roosevelt Road Structure. —Traffic Cared for During Progress of Work.

By ROBERT S. ARTHUR

REBUILDING the old Twelfth Street Viaduct, now called the Roosevelt Road Viaduct, from Wabash Avenue to the Chicago River, a distance of 2,000 ft., including the crossing of State, Dearborn and Clark streets, as well as fifty-four tracks of seven railroads, to form a link in the city's boulevard chain, is a job that is being handled, both in design and construction, by the Bridge Department of the City of Chicago.

The removal of an old steel viaduct and replacing it with a \$2,000,000 reinforced concrete structure without interfering with street car traffic above, or railroad tracks below, presented many difficult features. The plant and method of operation which were adopted has proved successful, and the south half of the viaduct is now practically complete.

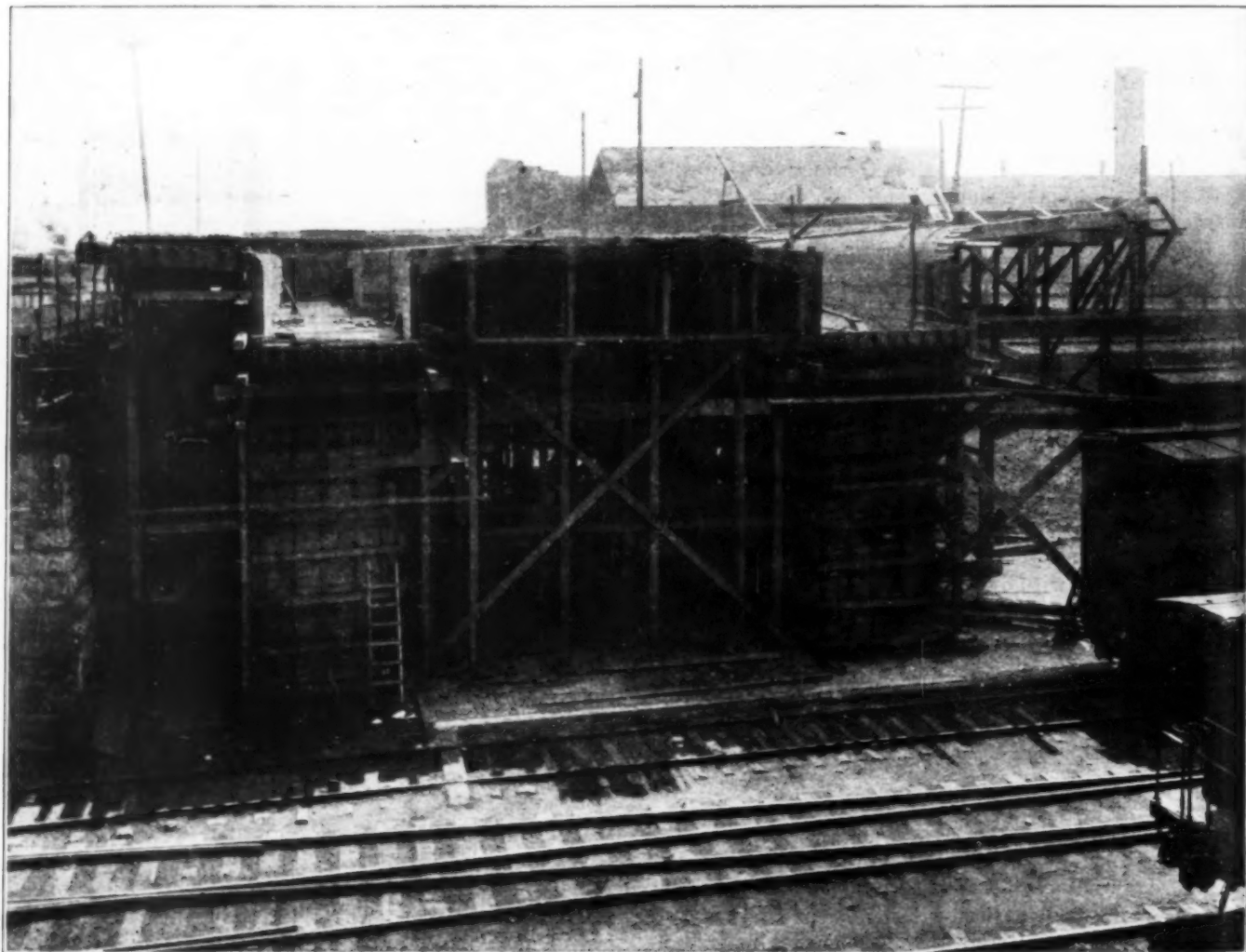
The new structure is a reinforced concrete slab and girder type with varying spans, the average being about 40 ft. The girders rest on concrete columns, the footings for which are carried down to rock, a distance of about 80 ft., by the usual caisson method. The first photograph shows the forms in place for a typical sec-

tion of the south half. The north half is to be identical with the south. The cantilever shown on the left carries the east-bound car track, while that on the right is the sidewalk which is to have a concrete balustrade which will be of the same design as balustrades on other parts of the boulevard chain.

When the south half is completed traffic will be diverted to it, the old structure removed, and the north half built.

The method of supporting the forms where the tracks below were alive all hours of the twenty-four is shown in the other photograph. The girders overhead were set in place by a 50 ton wrecking crane. From these girders rods were suspended supporting I-beams which in turn carry the forms. When the forms are wrecked, the rods which were covered with tar paper, are withdrawn from below without difficulty, by means of a stillson wrench.

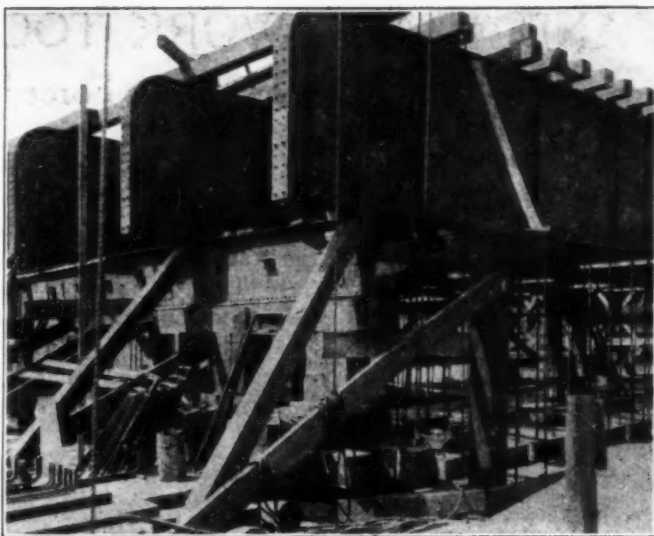
The plant consists of two 1 yd. mixers motor driven, 2 electric hoists, 3 double hoisting towers 140 ft. high with steel chutes. Sand and gravel are delivered by truck and dumped through the deck of the existing



THIS PHOTOGRAPH SHOWS A CROSS-SECTION OF THE SOUTH HALF OF THE NEW STRUCTURE.

structure into bins, and flows by gravity into the hoppers below. An average of 94 cu. yd. per hour is maintained by this plant. To facilitate the flow in the chutes and around the reinforcing, 8 per cent (by weight of cement) of hydrated lime is used in the mixture. Whether or not the advantage gained by the use of the lime warrant the extra expense and the strain on the eyes of the men handling it, still seems to be an open question. The lime is not used in freezing weather as it retards the set.

The completed viaduct from the River to Wabash Avenue will contain about 35,000 cu. yd. of concrete and 4,700 tons of reinforcing steel. Work was commenced in the spring of 1920. The organization is much the same as a contract job, the engineering staff being entirely

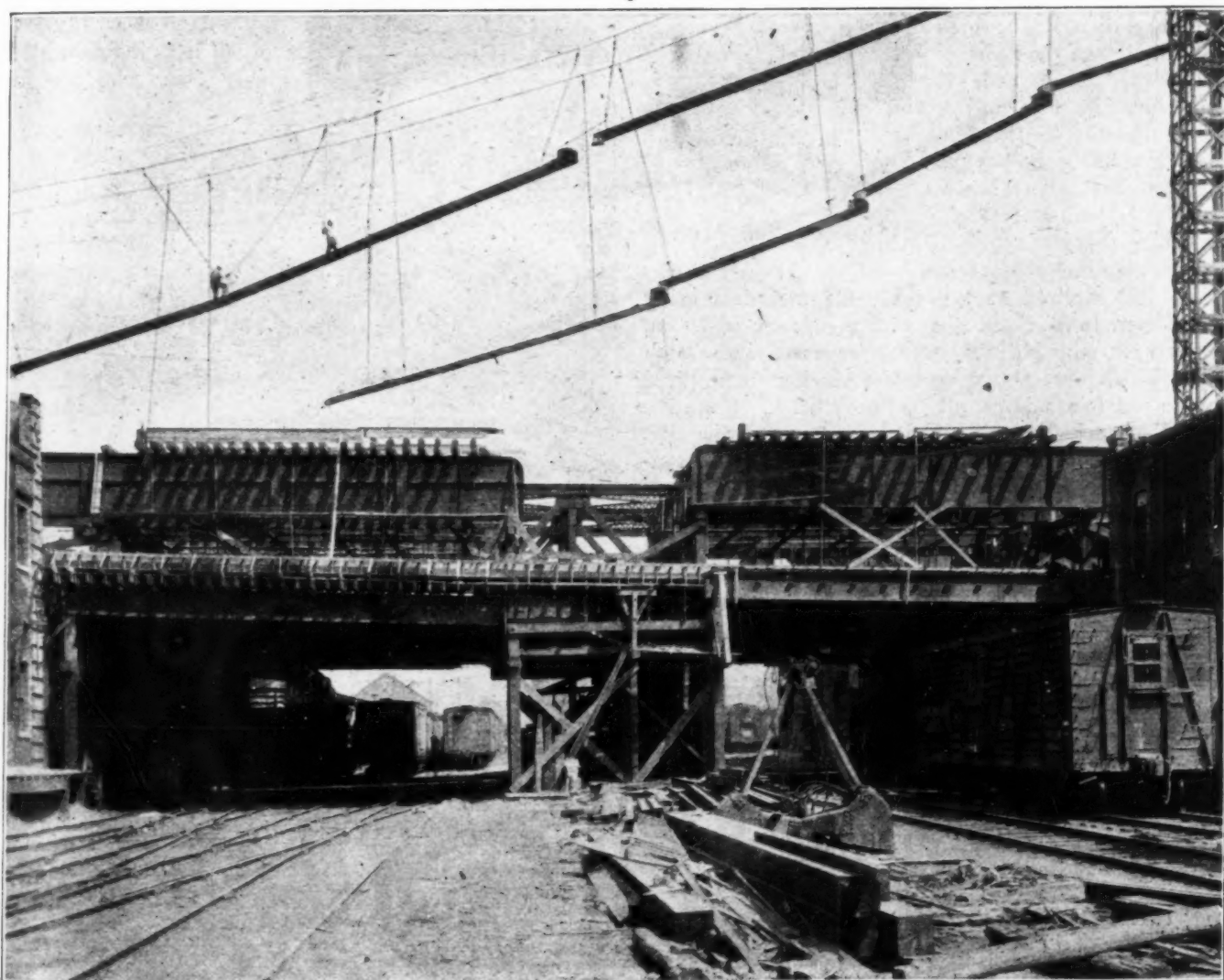


A CLOSE-UP OF THE BIG GIRDERS

independent of the construction forces. The entire work is under the direction of P. S. Combs, City Engineer. With the exception of the sidewalk balustrade, no part of the work is sublet; day labor being employed throughout.

To Study Highways

The University of Michigan has announced that five fellowships have been awarded by the Board of Regents. The five recipients of the fellowships are attending the University from December, 1920, until March, 1921, inclusive, and are candidates for the degree of Master of Science in Highway Transport and Engineering. They are Herschel C. Smith, R. R. Fauver, E. R. Olbrich, Chia T. Yeh and H. T. Corson.



A VIEW OF THE WORK SHOWING HOW THE FORMS WERE HUNG FROM HEAVY GIRDERS WHILE THE CONSTRUCTION OF THE VIADUCT OVER THE TRACKS WAS IN PROGRESS

TRUCKS AND TRACK WORK TOGETHER

Unusual Condition on Road Job in Pennsylvania Forced Contractors to Mix Methods

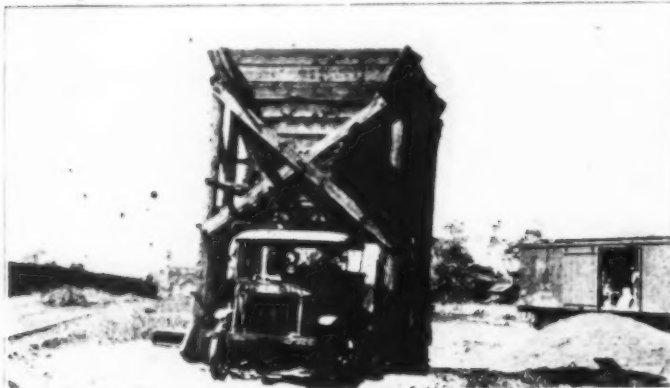
A COMBINATION of industrial track and motor transport was made necessary on a road job near Pottstown, Pa., by reason of the fact that the beginning

a minute. Each car carried two batch boxes and had a capacity of 2.8 tons. A 6-ton gasoline locomotive hauled the trains filled with materials to the mixer.

The road was by no means level and in one place there was a grade of 8.2 per cent for 600 ft. The batch boxes were of the tip-over type, with a separate container for the cement and handled a four-bag batch of 1:2:3 mix. A subgrader and finishing machine completed the job.

At the time the photographs accompanying this article were taken the trucks were carrying the batch boxes two and one-half miles and Winston Brothers were building a mile of road a month over heavy grades with a force of only 34 men.

The combination of trucks and cars as used on this job had several marked advantages. The material was inspected at the unloading plant making it unnecessary to reject any of it as it reached the job. There also was no



FROM BIN TO TRUCK.

of the road to be built was a mile and one-half from the unloading plant which was situated in the heart of the town. This made it impossible to use narrow gauge track from the unloading plant to the job and Winston Brothers, the contractors, substituted trucks to bridge the gap.

A clamshell bucket was used to unload the cars when they arrived at the yard, the materials being transferred to overhead bins with a capacity of 20 cu. yds. From the bin they were discharged into batch boxes which were placed on motor trucks. It required only about four minutes to load each truck. From the yard the trucks took the batch boxes through the city, across the Schuylkill River, and over the completed concrete road to a point about a mile and one-half from the mixer.

At this point the narrow gauge track began and the batch boxes were transferred from the trucks to the cars by a transfer crane. This operation required only



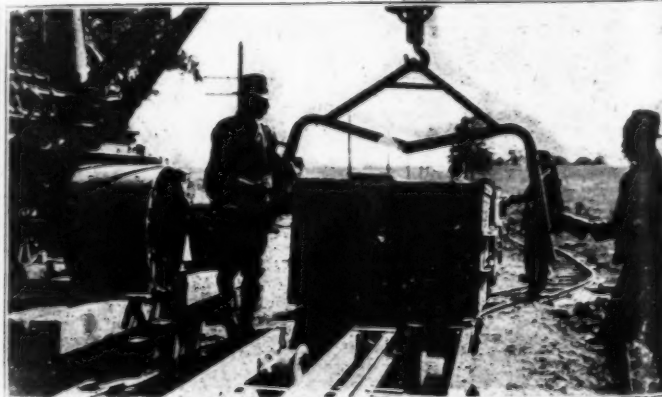
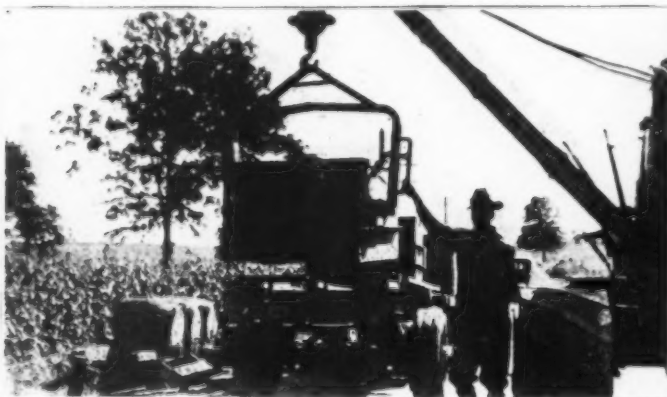
ON THE TRUCK.



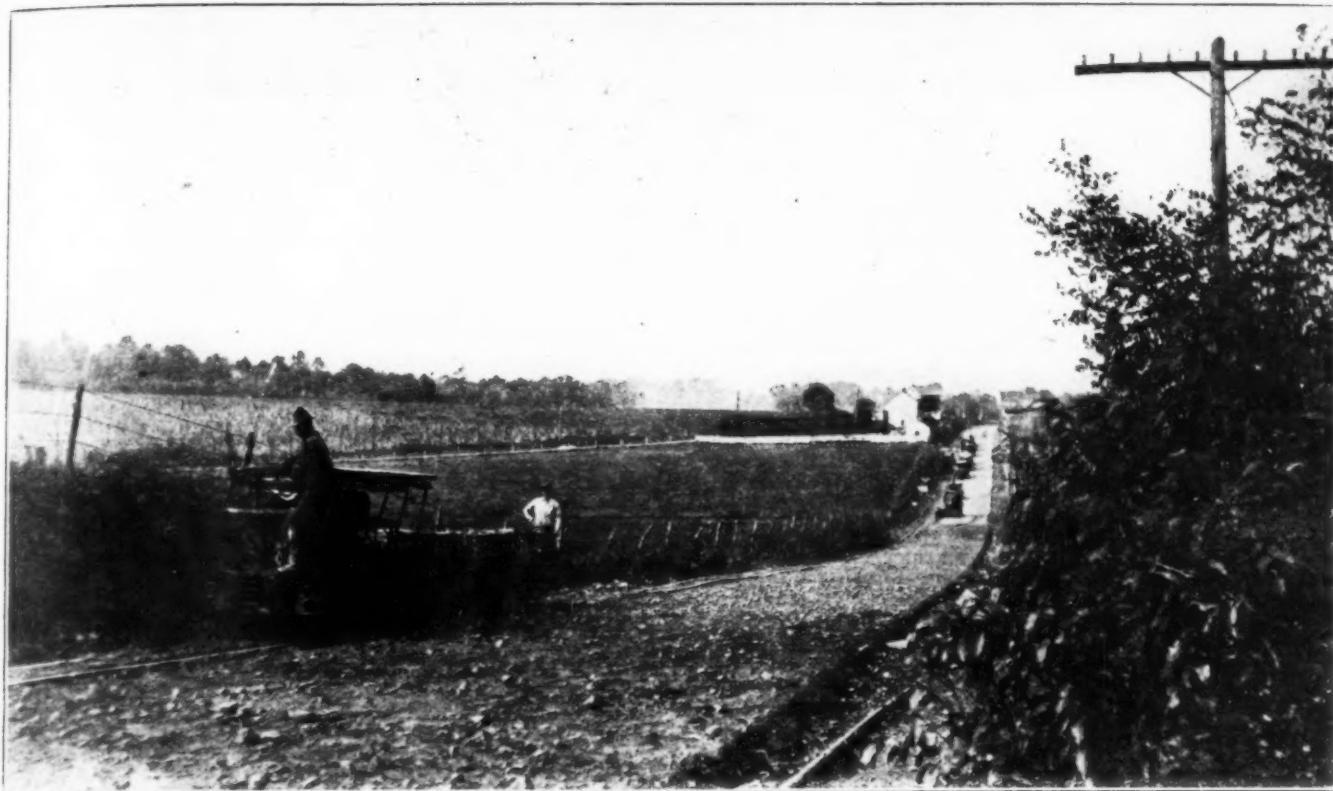
FROM TRUCK TO CARS.

loss of cement bags as the bags were packed and baled under cover in the yard.

The transfer of batch boxes from truck to cars was



THESE TWO PHOTOGRAPHS SHOW IN DETAIL THE TRANSFER OF THE BATCH BOXES FROM THE TRUCKS TO THE CARS.

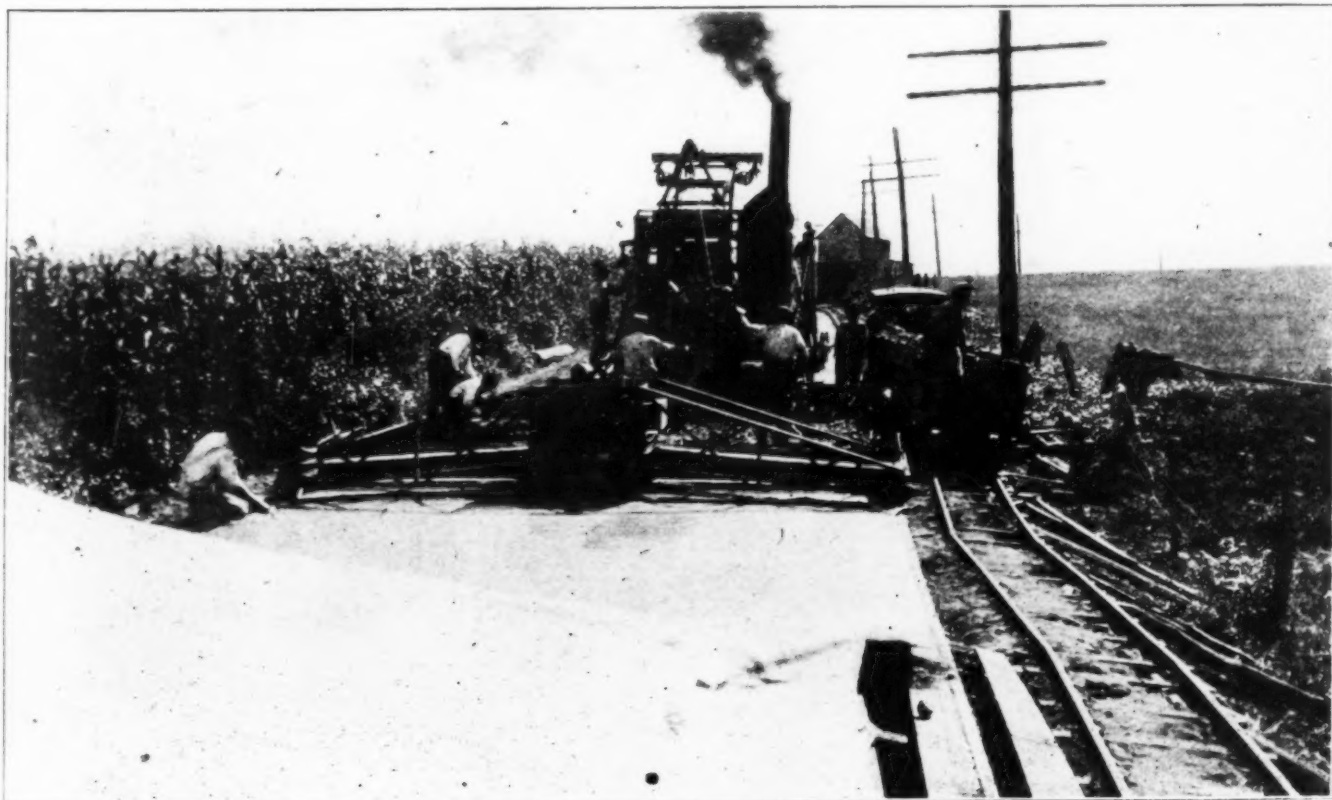


MAKING THE GRADE WITH A THREE CAR TRAIN ON THE WAY TO THE MIXER

made quickly and economically and the trucks were kept off the prepared subgrade. The speed with which the material was carried from the yard in town to the mixer made it possible to begin laying concrete as soon as 1,000 ft. of the subgrade had been completed. The trucks made about 10 miles per hour and the trains could be

depended upon to make 8 miles per hour on level ground and about 2 miles per hour on the stiffest grade on the road.

This combination of methods shows how a little ingenuity on the part of the contractor enables him to adjust his plans to meet unusual and difficult conditions.



ARRIVING AT THE MIXER. THE BATCH BOXES HAVE REACHED THE END OF THEIR JOURNEY

SNOW FLIES IN CHICAGO

New Machine for Loading Trucks Saves Men and Money

IN the November, 1920, issue of SUCCESSFUL METHODS, the methods used by the different states to keep the roads open to traffic during the winter months were described and it was evident that there were many problems still to be solved. Some of these problems apply equally to city streets and country roads, and one of them seems to have been solved by the city of Chicago which has been using a new type of snow loader this winter.

At the time of writing the machine had had an opportunity to show its worth on only two occasions, but it did its work well. What it accomplished is best described in a letter written by Thomas H. Byrne, Superintendent of Streets of the city of Chicago. This letter says in part:

"The loader was placed in operation at 7 a. m. Sunday, December 26, and with the exception of stopping for meals and one minor repair, operated continuously until 3 p. m. Monday, December 27, a continuous run of 32 hours. The loader continued in intermittent operation until Wednesday, December 29, when the removal of the snow in the loop district had been completed. During the period of the operation of the loader no breakdowns of any moment occurred.

"The loader requires the services of four men, one engineer to manipulate the loader, one helper for the engineer who will manipulate the plow, and two laborers whose time will be used mostly at the plow end.

"Since ceasing operations a special spout for controlling the flow of snow into the trucks has been installed on the discharge end of the conveyor. The sides of the plow also have been raised making possible greatly increased storage in the plow.

"The loader loaded snow at the rate of better than three cubic yards per minute, although no provision had been made in the plowing and piling of snow for this machine. Trucks carrying eight cubic yards were 'spotted'

and loaded out in less than five minutes. During the period of operation temperatures ranged from 32 degrees above zero to five degrees below zero, but no change was noted in the efficiency of the loader. During this same period, the snow ranged from slush to almost frozen, the loader apparently handling the different types of snow with equal success.

"The loader was operated with equal success on bituminous, wood block, granite block and cobble stone pavements.

"Hereafter, on such streets as the snow loader shall be assigned to, we will plow the snow in a windrow along the curb as the machine will load to a width of six feet from continuous windrow equally as well as from isolated piles. We can see no advantage to a side discharge, as while the truck is being moved into place the loader is advancing storing from three to six cubic yards of snow in the plow and on the belt. This entire storage is discharged into the truck in approximately two minutes so that no time is lost.

"With the present loader we are effecting a labor saving of better than \$450 per eight hour shift on shoveling from piles into trucks. While we are unable to state at this time, yet it is probable that we effect an equal saving in the hand work necessary to pile snow along the gutter lines after plowing. Where we have always had difficulty in organizing crews for night work, we are now able by use of this snow loader, to remove snow at night, which time is most advantageous to us on account of the congestion of traffic during the day.

The 25 h.p. gas engine requires less than one gallon of gasoline per hour and about one quart of oil per eight hour shift. The cost of operating the snow loader, exclusive of interest, depreciation, etc., is less than \$30 per eight hour shift. Our past experience has been that approximately six men would load an eight yard truck in 20 minutes, whereas the snow loader will load the same eight yard truck in 2½ minutes. As the foregoing statements would indicate, we are pleased with the results thus far obtained from the snow loader, and believe therefore, that we will use this method of snow handling as rapidly as conditions will warrant."



CHICAGO'S NEW SNOW LOADER AT WORK ON MICHIGAN AVENUE

DIVIDING UP THE BIGGEST ROAD JOB

Scientific Study Dictated Selection of Points for Proportioning Plant in Maricopa County Highway System

BY WALTER S. ANDERSON

ONE of the most important economic problems confronting a contractor in modern road construction is the correct determination of the number of central points where material can be proportioned and hauled to the adjacent roads to be paved. Many factors enter into this determination, some of which are theoretical and others purely practical. To date, little thought has been given to the economic solution of this important problem, but more study must be given to it because of the rapid adoption of industrial railway plants for the building of permanent highways.

For the purposes of this article the Maricopa County Highway system of concrete roads now being built by Twohy Brothers in the Salt River Valley, Arizona, is taken as an example. On the Maricopa County project, which provides for the building of 315 miles of pavement, industrial track is being used.

Railroads are essentially the deciding factor in determining the location of central proportioning plants as it is cheaper and more practical with an industrial railway plant to proportion the material from a plant located on a railroad siding than to proportion it from a plant at a distance from the railroad.

Available sidings on the adjacent railroads form an important consideration from the standpoint of initial expense to the contractor. If available sidings are improperly located, a contractor can have sidings installed in new and proper locations provided the topography of the ground, etc., is favorable and if the expense of installa-

tion is offset by the savings which will accrue. Sidings should be so located as to require a minimum length of narrow gauge track for the construction of the greatest number of miles of road from the particular siding in question. The minimum length of track to use from any one set-up is based on the shortest haul obtainable from the available sidings.

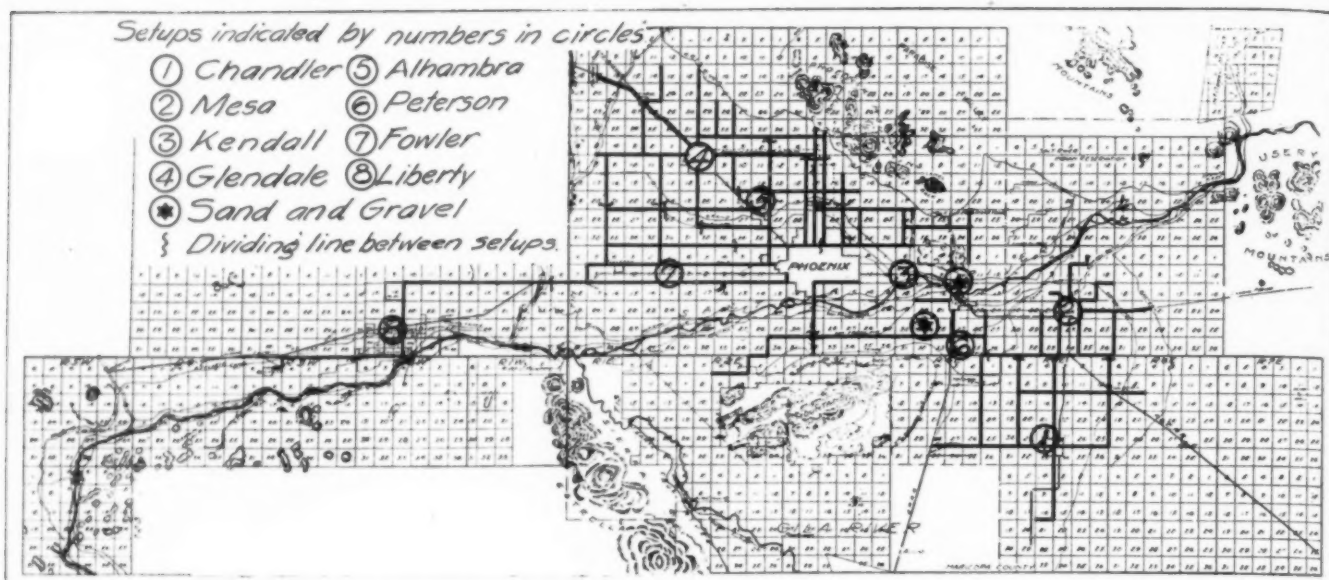
Another consideration which enters into the Maricopa County System of roads is the preference expressed by the County Commissioners based on practical and financial reasons, for the construction of certain roads ahead of other roads. Furthermore, the Maricopa County Road System is divided into projects numbered from 1 to 45 and 10% is withheld from each separate project until it has been completed and accepted. It, therefore, behooves the contractor to complete all of the project begun from any one set-up as soon as possible if the other economic factors allow him to do so.

Grades also would enter into this determination under ordinary circumstances, but in Maricopa County grades do not exceed $11\frac{1}{2}\%$, so they do not become a determining factor.

In addition to the factors mentioned, one of the most important is the cost of tearing down, moving and setting up a central proportioning plant. To illustrate, let us assume that a change in set-up costs \$5,000 and an 8-mile road is to be built from this set-up; that three sidings are available, one in the center of the road and the other two at the quarter points. If two set-ups are used, the



THE TRESTLE AT THE FOWLER SETUP ON THE MARICOPA COUNTY JOB. THE ROOF OF THE CEMENT HOUSE BESIDE THE TRESTLE MAY BE SEEN AT THE LEFT. SOME OF THE NARROW GAUGE TRACK ALSO IS SHOWN.



A MAP OF THE MARICOPA COUNTY HIGHWAY SYSTEM SHOWING THE EIGHT POINTS AT WHICH THE PROPORTIONING PLANTS WILL BE LOCATED.

average haul is one mile. If one set-up is used, the average haul is two miles.

Let us assume one mile of road contains 4,000 tons of material. If one set-up is used, 32,000 tons of material will have to be hauled one extra mile, or 32,000 ton miles. If it costs 35c per ton mile when the average haul is one mile, and 30c when the average haul is two miles, the hauling expense for two set-ups will be \$11,200. If one set-up is used, the hauling expense is \$19,200 or an additional expense of \$8,000. However, the cost of making the second set-up is \$5,000, so by making one set-up the cost is still \$3,000 more and also the equipment needed is greater in quantity, so the initial equipment expense is more than for one set-up.

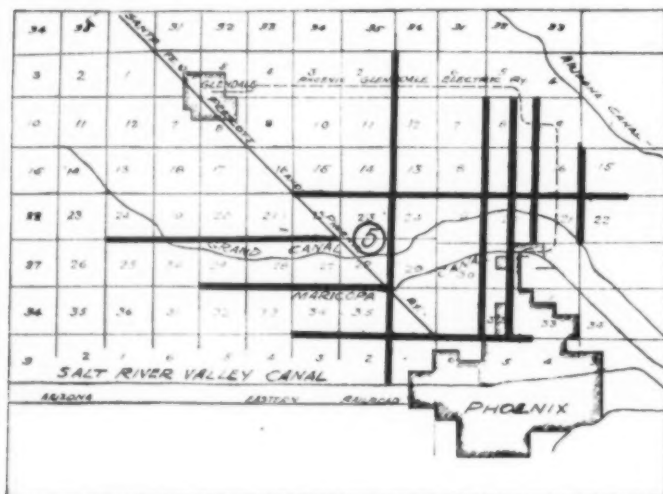
But the time of changing set-ups generally means a loss in actual concreting time of from three to four weeks, and generally occurs in the best part of the working season. The expense to the contractor in losing these valuable weeks is considerable and will in many instances be greater than the \$3,000 item mentioned. This illustration is given merely to give to the contractor a thought worthy of serious consideration.

Still another factor entering into the determination of set-ups in Maricopa County covers the methods used in handling the material at the set-ups. Bulk cement

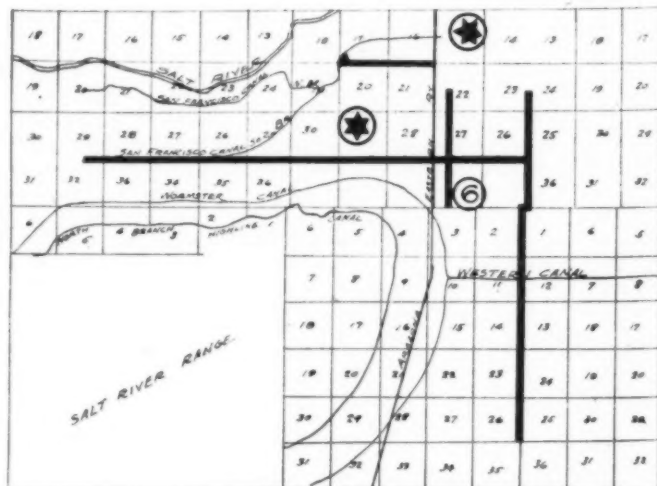
is being used and is handled by means of a vacuum system. The cost of installing this system of cement handling is expensive and is an item that must be considered. On the other hand, sand and gravel are hauled in standard gauge bottom dump railroad cars, which necessitated the building of a standard design of railroad trestle with bunkers constructed underneath. The cost of tearing down, moving and erecting this trestle is appreciable, and the number of moves or set-ups that can be made resolves itself into an economic question. A trestle of sufficient strength to receive standard gauge cars and locomotives is expensive to build and the economic saving in constructing a trestle of this expense depends on the volume of material handled. Therefore, a large mileage of roads must of necessity be built from any one set-up.

In some cases, the problem of obtaining sufficient right of way for the material plant at the proposed set-ups limits their final location.

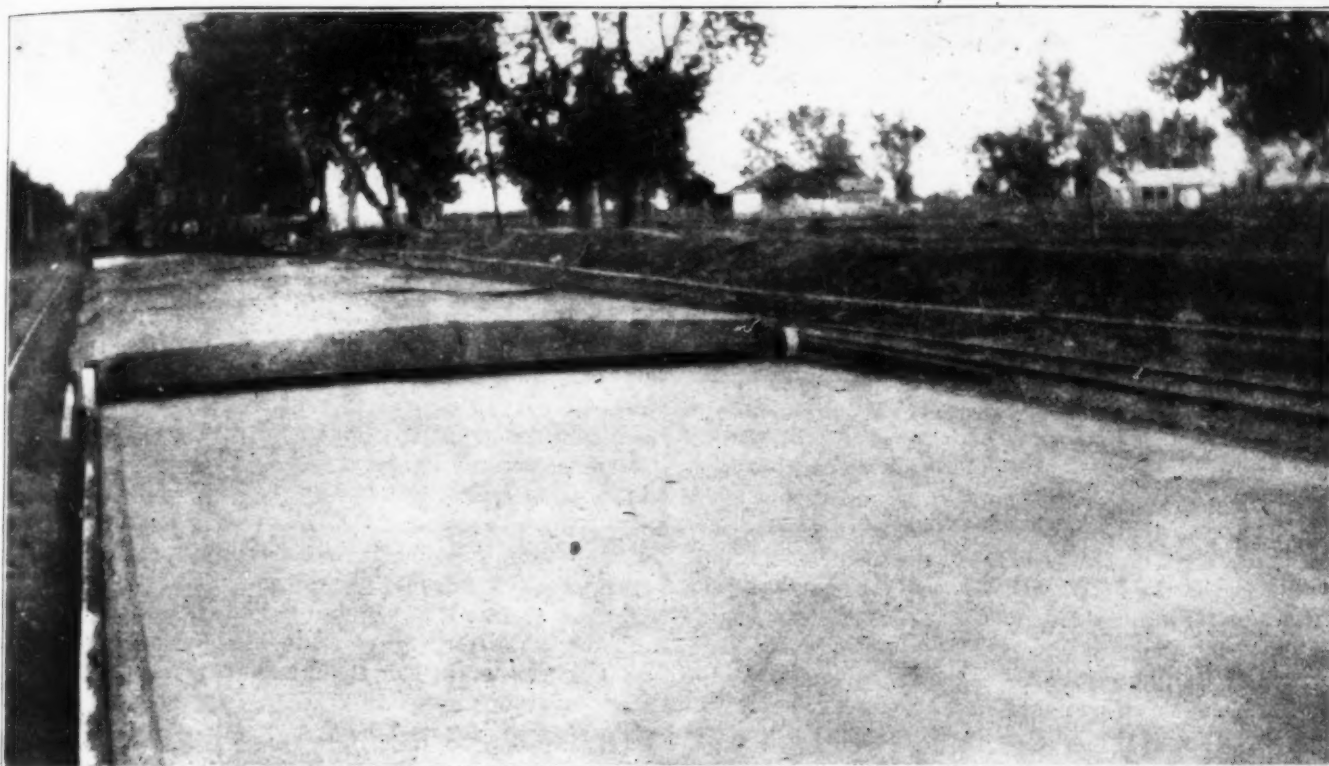
Let us consider the 280-mile system of roads now under construction in Maricopa County, a map of which is shown. Note the location of the railroads in this county. The final layout calls for the location of set-ups at Chandler, Mesa, Kendall, Glendale, Alhambra, Peterson, Fowler and Liberty. The following mileage will be



THIS NETWORK OF HIGHWAYS WILL BE BUILT FROM THE ALHAMBRA SET-UP.



THESE ROADS WILL BE CONSTRUCTED FROM THE PETERSON SET-UP.



FINISHED PAVEMENT SHOWING THE COVERING USED TO PROTECT IT FROM THE HOT ARIZONA SUNSHINE

built from the respective set-ups mentioned, or eight in number:

	Miles
Chandler	37½
Mesa	29½
Kendall	30
Glendale	52
Alhambra	43
Peterson	21½
Fowler	41½
Liberty	19½
Subcontract	8½
Total	283

Two complete plants have been installed thus far, one at Fowler and the other at Chandler. A third trestle

and cement shed will be constructed at one of the other set-ups to receive the machinery from either Fowler or Chandler, whichever is completed first. This means there will always be a third trestle and cement shed to be torn down, moved and set up while the two road plants are operating. This will insure continuous operation of most of the units of the road construction plant.

In planning the set-ups indicated on the map, Twohy Brothers took into consideration the points mentioned in this article. The work now is in full swing from the Fowler and Chandler set-ups. The progress of this job, the biggest single road job in the country, will be described from time to time in the columns of **SUCCESSFUL METHODS**.

EXPANSION JOINTS WITH FINISHING MACHINE

THE practicability of constructing expansion joints with a mechanical road finishing machine has been demonstrated in the concrete highway work in New Jersey.

It is necessary that the joint material be placed directly in line with and parallel to the tamping board of the machine. This is best accomplished by moving the machine forward until the tamping board is at the point where the joint is to be placed and marking the side forms where the ends of the board touch. The machine is then moved away and the joint material placed in a straight line across the road between these points. This will insure the joint material being directly in line with the tamping board at all points and permits of tamping right up to, and along the face of, the joint.

After tamping up to the joint the progress of the machine should be stopped, with the tamping board only in motion, and the tamping continued at the joint until the concrete is uniformly and thoroughly compacted at all points along the joint. The tamping board should then be carefully raised over the joint and the same

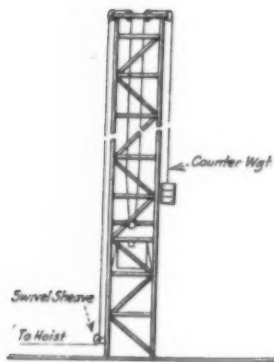
operation continued on the other side. This tamping directly at the joint on both sides in this manner, and away therefrom in both directions, should be continued until the desired finish is secured.

The form board and stakes holding the joint material in place should not project above the filler. This board is usually removed immediately after the first tamping has been done on both sides of the joint, depending however, on the consistency of the concrete which should be rather "stiff" when the finishing machine is used. After removal of the form board the tamping is continued until the concrete is well back filled along the face of the joint.

Care should be taken not to allow the machine to push an excess of material up to or across the projecting joint material which will displace the joint. When the machine progresses up to within 3 or 4 feet of a joint, the excess material should be removed or levelled off with shovels, the machine moved forward to the joint, and the tamping board set in motion again.

HELPING THE HOISTING ENGINE

By J. H. WILLIAMS



ON construction work the hoisting engine often lacks adequate power for properly hoisting the concrete bucket. The usual method of overcoming this lack of power is to rig the hoist line with a double whip, which naturally slows up the speed of the bucket, and a contrivance that will give relief without the usual slowing up is of interest to any job.

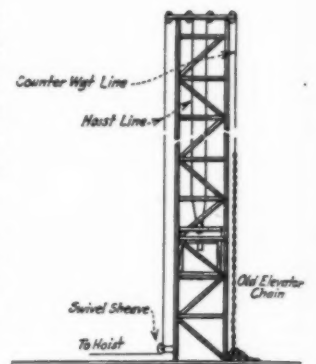
A scheme that has worked satisfactorily is to place a counterweight on the bucket. The regular hoisting line is attached to the bucket and led over the sheaves on the cat-head of the tower and down to the hoisting engine in the usual manner.

A second line is fastened to the bucket and led to the cat-head and down one side of the tower, where it will be out of the way. To this line is fastened a counter-

weight box. The length of line should be just sufficient to clear the ground at the base of the tower when the bucket is raised to the highest point of travel. This weight should not be great, as too much weight will slow down the bucket on its return trip and is not necessary. By experimenting, just the right amount of counterweight can easily be ascertained.

It is well to fasten the counterweight box by means of guides or by letting it follow a wire line by means of a snatch block, in order to prevent twisting.

The scheme may be improved greatly by supplementing the box with a heavy chain in the same manner as used on elevators. This chain may be purchased as scrap from some junk dealer and the time saved on the job will more than pay for its cost.



HOME COMFORTS IN A CONSTRUCTION CAMP

THERE are camps and camps, but that run by Charles Thompson on an irrigation job at Delta, Utah, last summer, was a splendid example of what a construction camp ought to be. Mr. Thompson decided that the way to keep the men contented was to provide all the comforts of home.

He discovered that his men found little pleasure in doing their own washing, so he built a wash house and installed an electric washing machine in charge of a

capable woman who knew all the ins and outs of the washing business. In the photograph which accompanies this article she may be seen leaving one of the camp buildings on her way to the wash house which is in the extreme left of the picture.

Not content with this modern improvement Mr. Thompson added still more to the comfort of his workers by providing a phonograph to be played during meal time. Music with meals was the order of the day.



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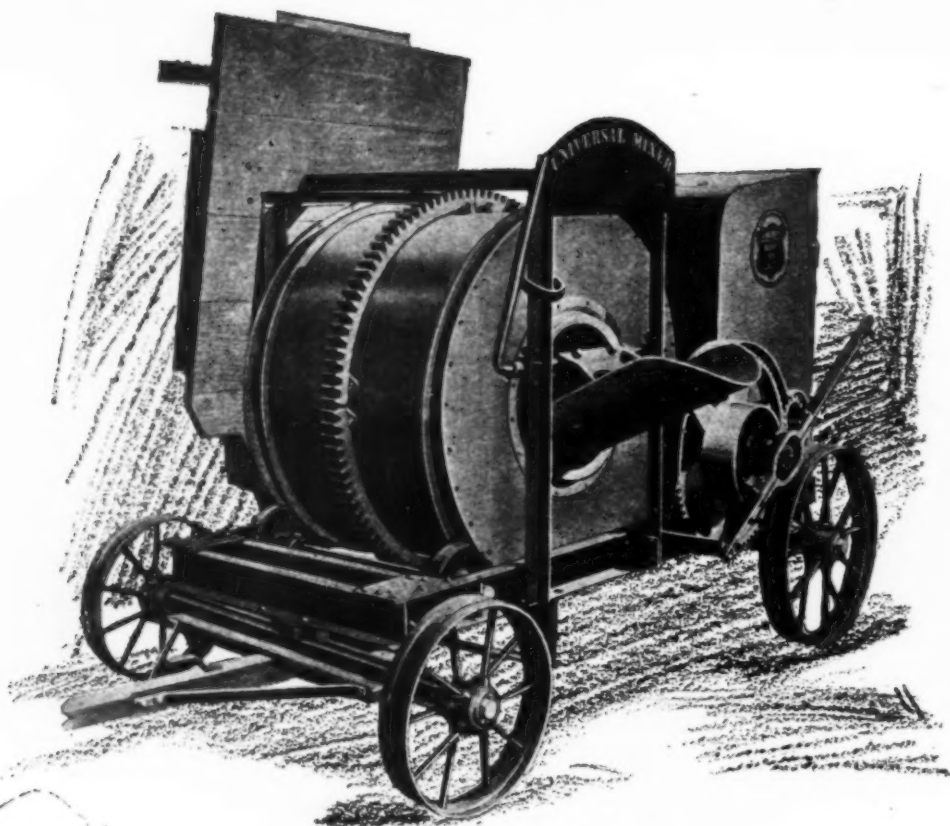
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Team pole standard equipment. All steel frame.

Steel engine house furnished which is very secure and at same time allows easy access to all parts.

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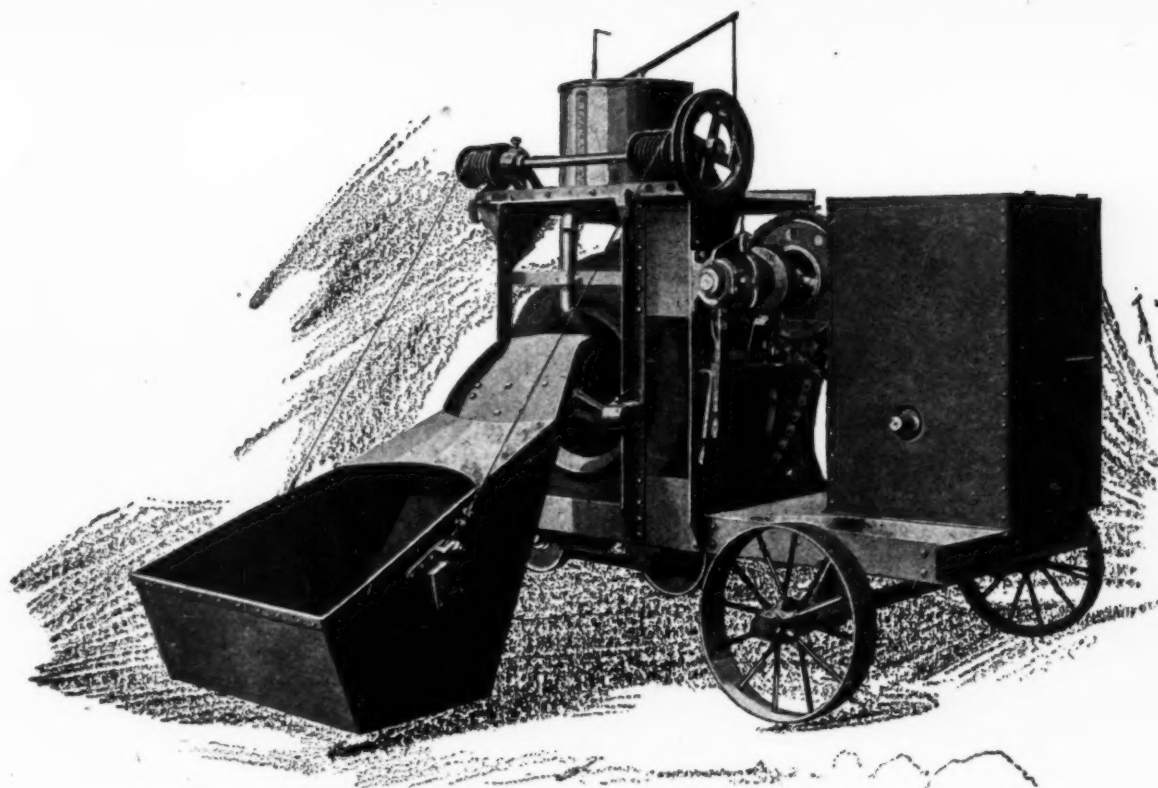
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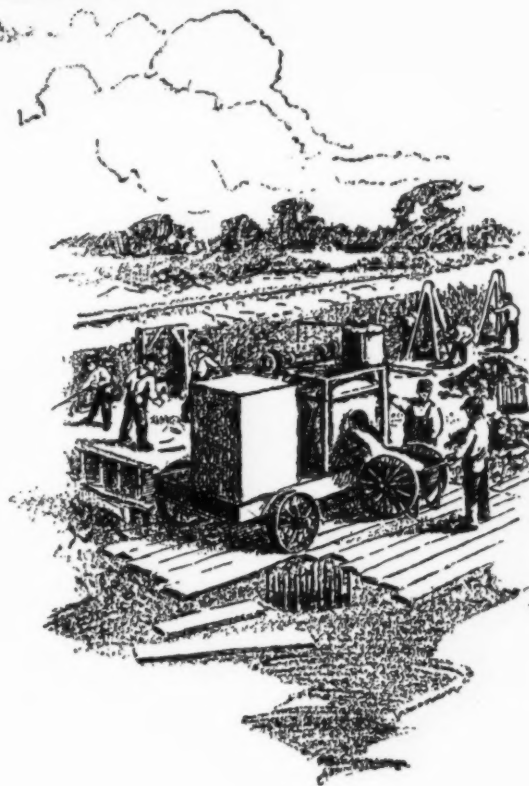
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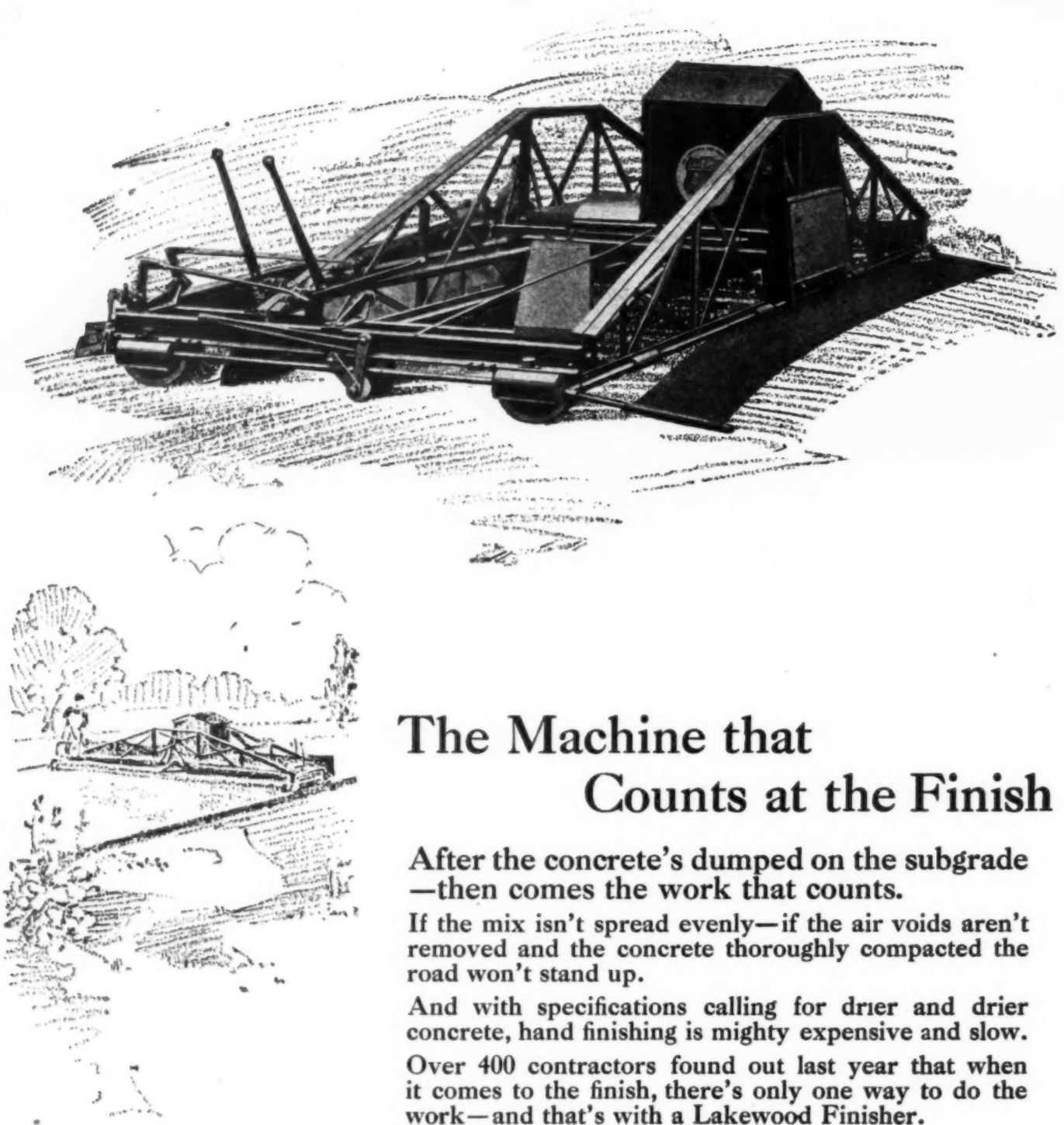
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The Machine that Counts at the Finish

After the concrete's dumped on the subgrade—then comes the work that counts.

If the mix isn't spread evenly—if the air voids aren't removed and the concrete thoroughly compacted the road won't stand up.

And with specifications calling for drier and drier concrete, hand finishing is mighty expensive and slow.

Over 400 contractors found out last year that when it comes to the finish, there's only one way to do the work—and that's with a Lakewood Finisher.

It makes better concrete roads—and it cuts down the cost and speeds up the work.

You ought to know about this machine. Shall we send complete data and list of users in your neighborhood?



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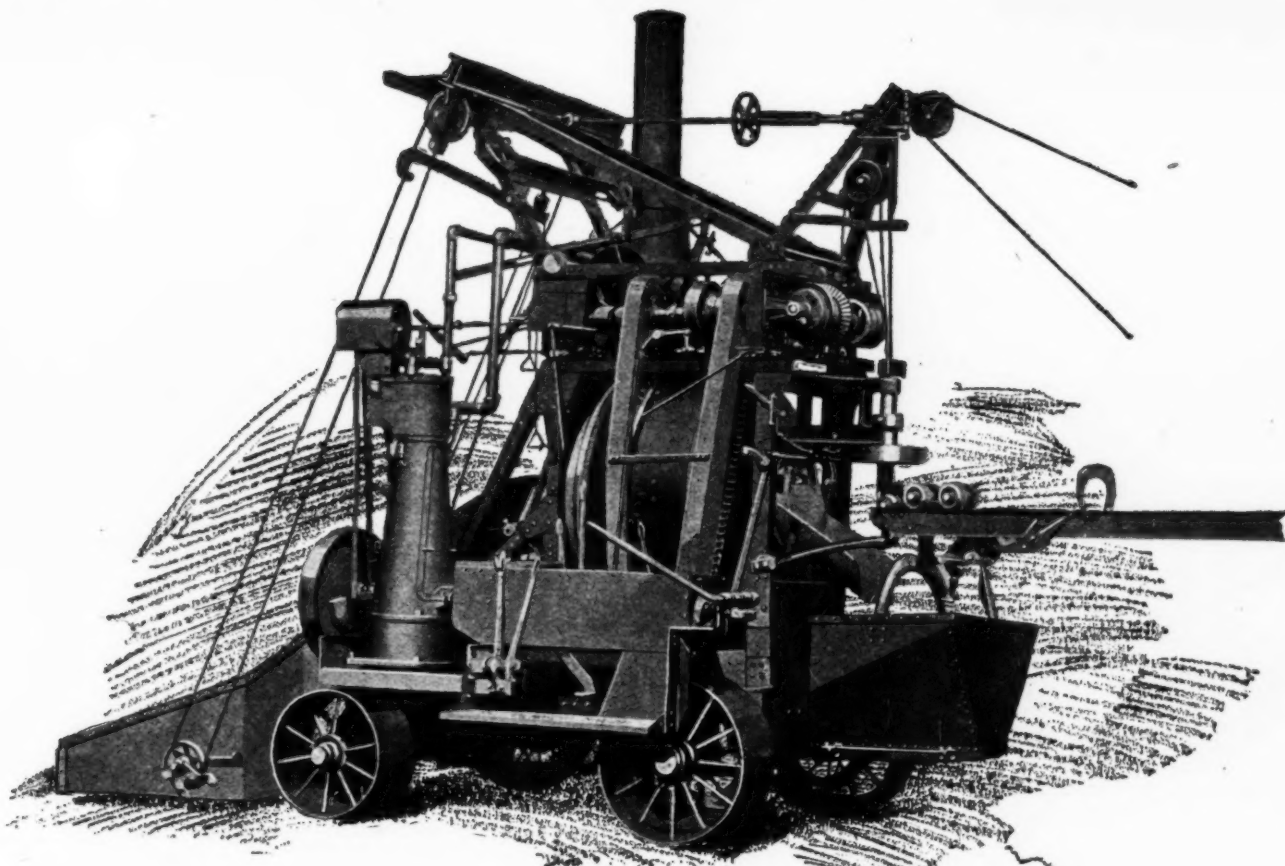
RICHMOND
HOUSTON

ATLANTA
CHICAGO

MILWAUKEE
CLEVELAND

Lakewood

THE LAKEWOOD ENGINEERING



Are These Features On Your Paver?

Are you going to get all you can for your money when you buy a Paving Mixer this year?

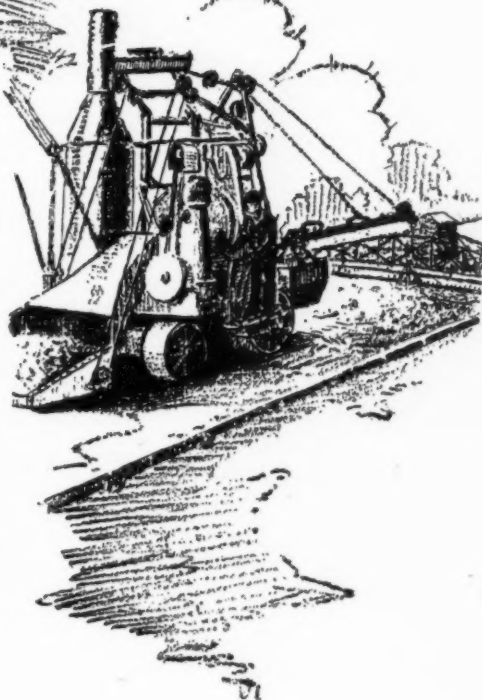
Sure you are! So just check over the following points on the Lakewood Paver right now.

Adjustment features to keep boom horizontal on any grade. All levers easily reached from operator's platform. Power steer for easy operation. Wheels 14 in. wide. Automatic water tank.

Batch Transfer requiring no extra hoist. Power enough to climb 30% grade. Solid type "safety first" fly wheel. Caterpillar traction, if desired.

These are only a few of the reasons why Lakewood Pavers "stand the gaff".

Ask for complete information.



WRITE THE NEAREST OFFICE

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SEATTLE

ST. LOUIS
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INDIANAPOLIS
MINNEAPOLIS
KANSAS CITY

DES MOINES
PITTSBURGH

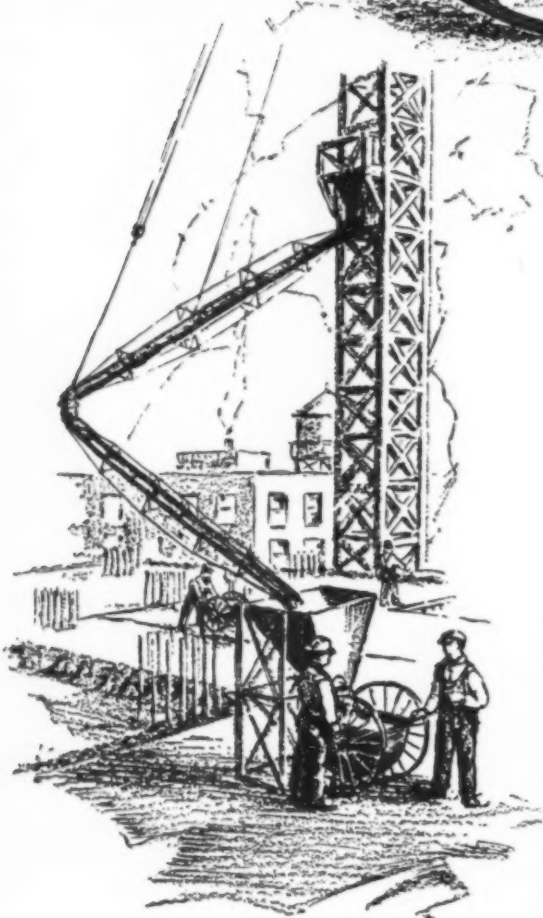
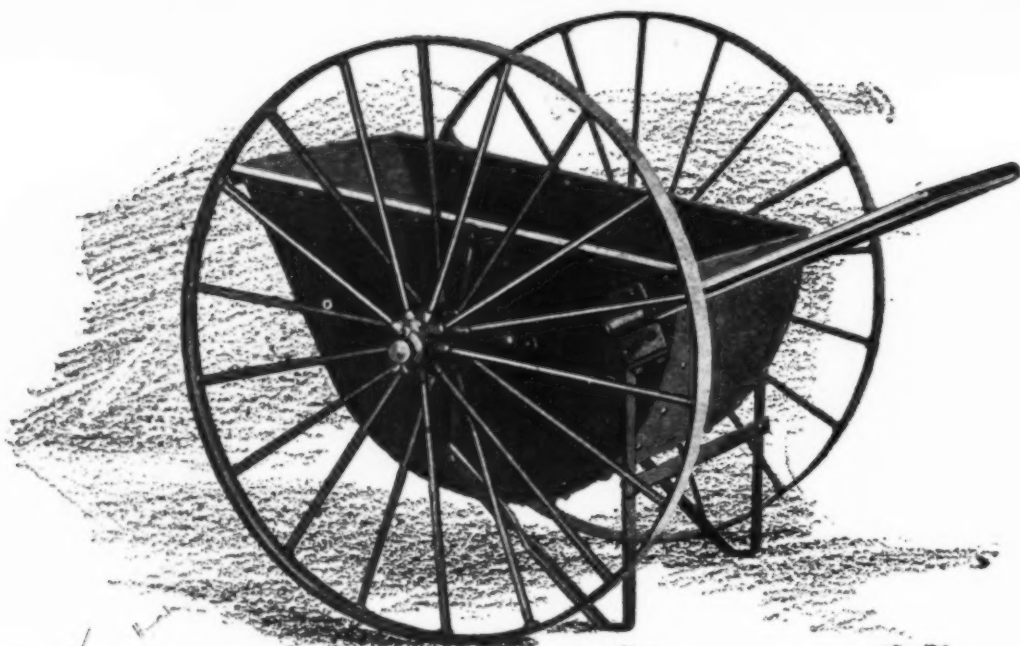
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LOS ANGELES

EXPORT-ALLIED MACHINERY CO. OF AMERICA, N.Y. CITY

Methods and Machines



COMPANY, CLEVELAND, U. S. A.



Try Lakewood Carts On Your Jobs This Year

Lakewood Concrete Carts are good carts—they have a reputation for standing up. Many of them have been in use 10 years and more.

Here are a few reasons why contractors like Lakewood carts:

Axle does not run through body. Clean discharge assured.

Strong 42 in. wheels with 18 spokes and 2 in. tread.

Nestible body requires less storage room.

Legs added in field without drilling holes in body.

Heavy construction. Grease cup lubrication.

*Get the "dope" on Lakewood
Carts. Write the nearest office.*



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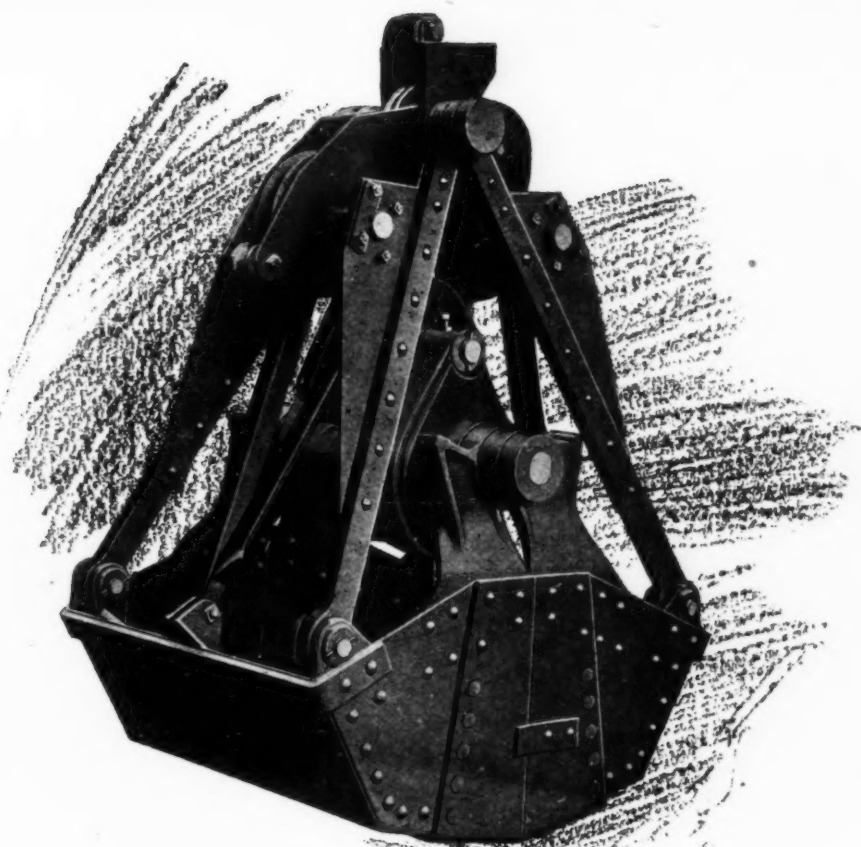
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Lakewood

THE LAKEWOOD ENGINEERING



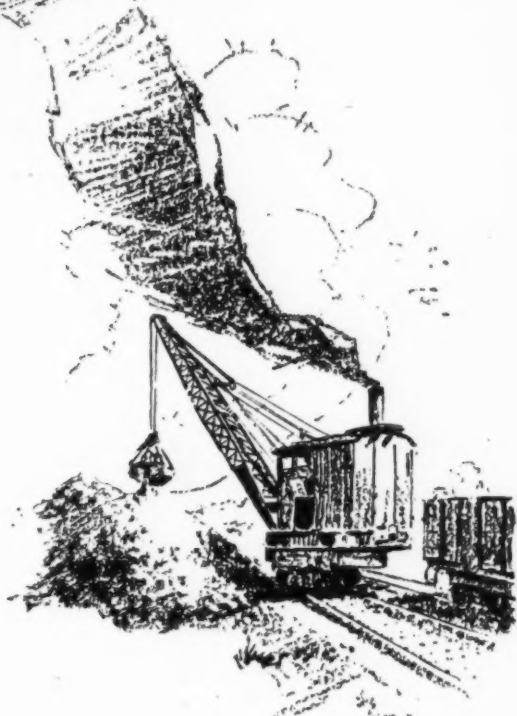
Move It With A Lakewood Clam-Shell

Sticky clay or fine sand—crushed stone or boulders—you can handle them quicker and at less cost with a Lakewood Clam-Shell.

It digs *down* as it closes *because the upper sheaves are on the closing arms*—an exclusive Lakewood feature.

It opens wide—no time lost in dumping. Short cable overhaul cuts time lost between loads.

Cut your costs by moving it with a Lakewood Clam-Shell.



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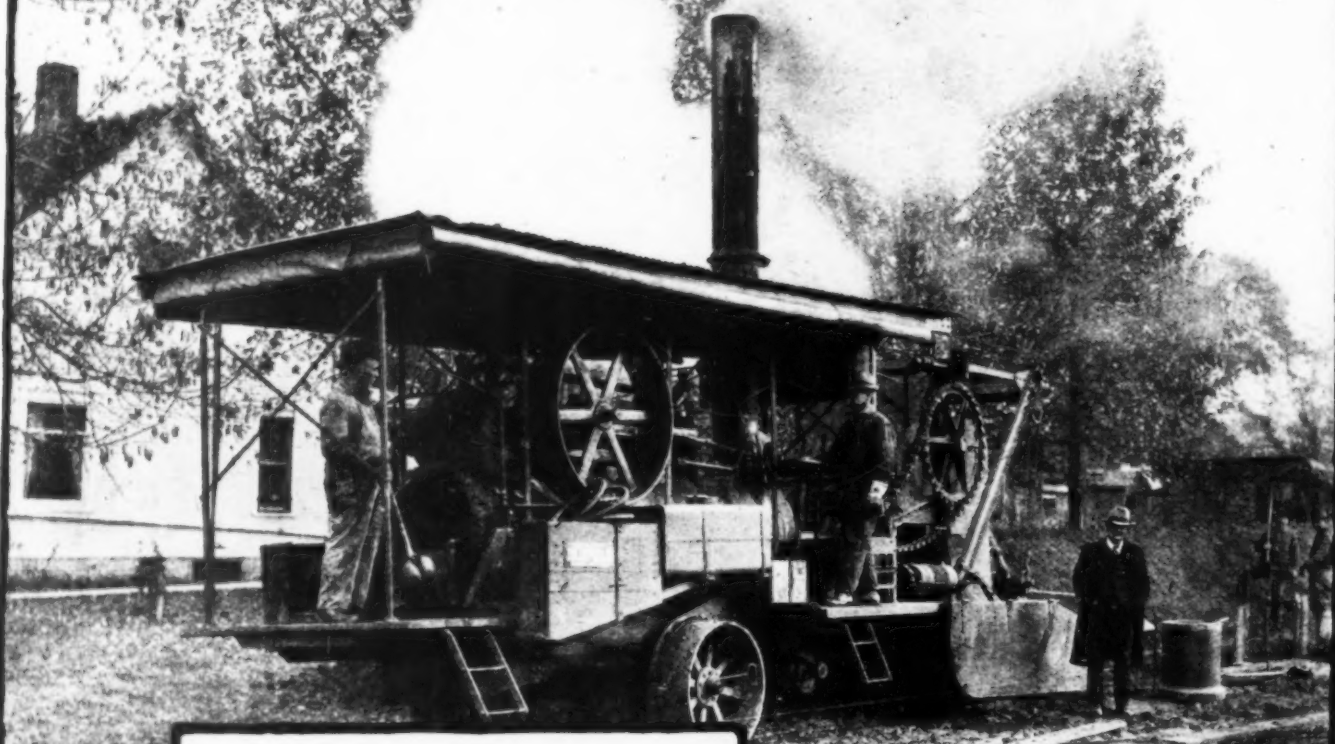
Methods and Machines



COMPANY, CLEVELAND, U. S. A.

PARSONS

800 Feet Per Day



W. O. Anno, a well known sewer contractor of Havana, Illinois, owns a Parsons Model 36 Steam Trencher. He writes:

"We have been doing splendid work with this machine. We have dug and laid 800 feet of sewer tile several days in succession. It is a great machine and will do all you claim for it and more."

The above means moving earth at the rate of 80 cubic yards per hour. This capacity, especially in the heavy sticky soil encountered on the Anno job, is a mighty fine performance and one that speaks in no uncertain terms of the tremendous digging ability of Parsons Trenchers.

Perfectly balanced design, built in highest quality of material, together with the many exclusive features of design, make PARSONS the biggest factor in profitable trenching work.

Mr. Contractor, write us today for data.

Pick a Parsons and Quit Picking.

We can make immediate delivery on practically all models of our equipment.

The Parsons Company

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